

Figure 1a

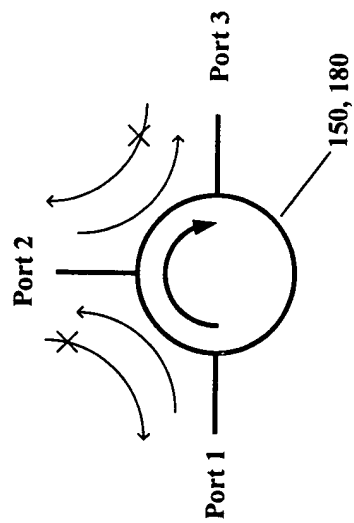


Figure 1b

Function	Selected Device	Advantage
Master Oscillator	Mode-locked Semiconductor Laser	Compactness Simple Electrical Pumping
Stretcher and Compressor	Chirped Fiber Bragg Grating	Compactness Large Dispersion Dispersion Manipulation Inherent Beam Shaping
Power Amplifiers	Semiconductor Optical Amplifiers	Compactness Simple Electrical Pumping

**Figure 2**

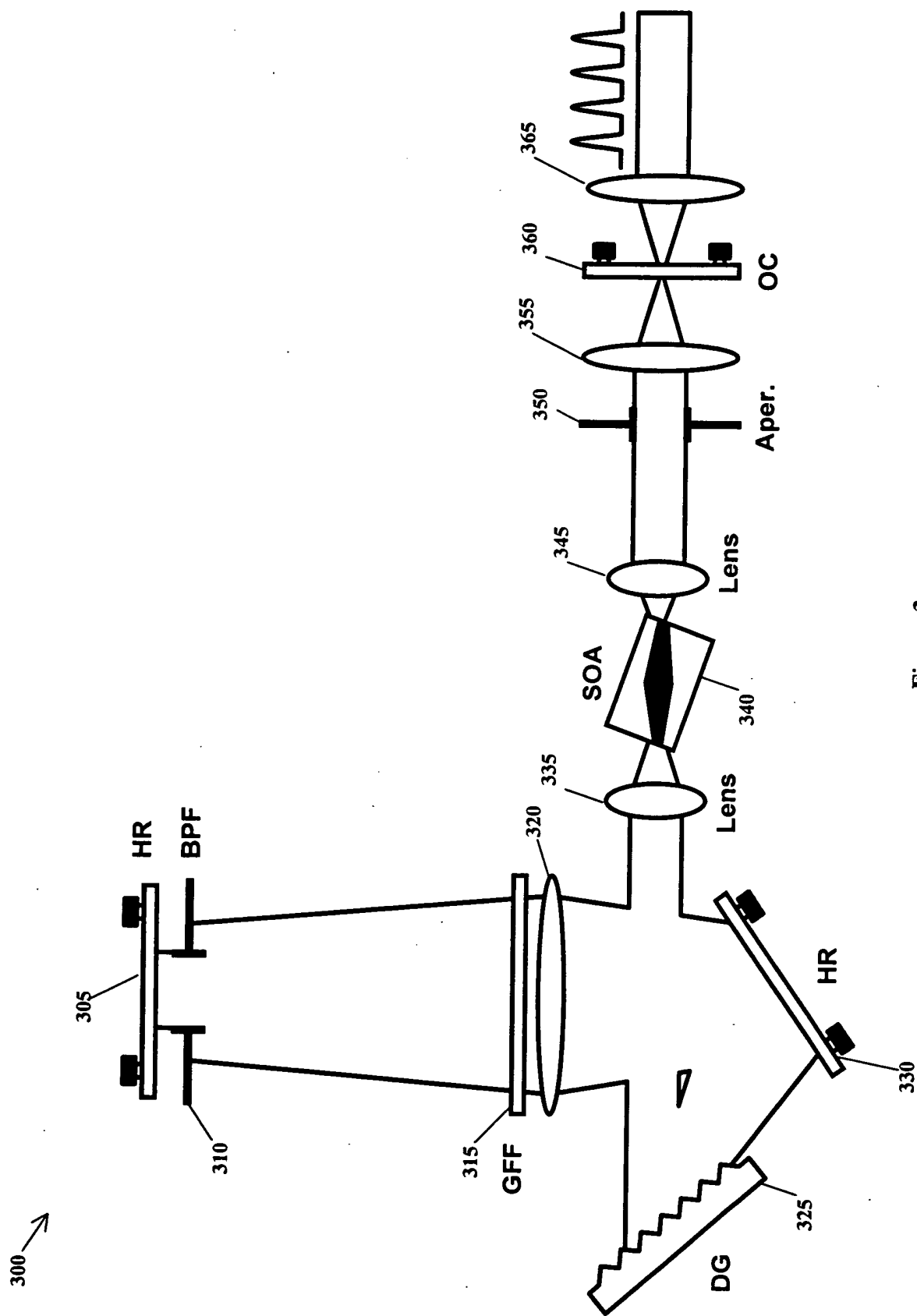


Figure 3

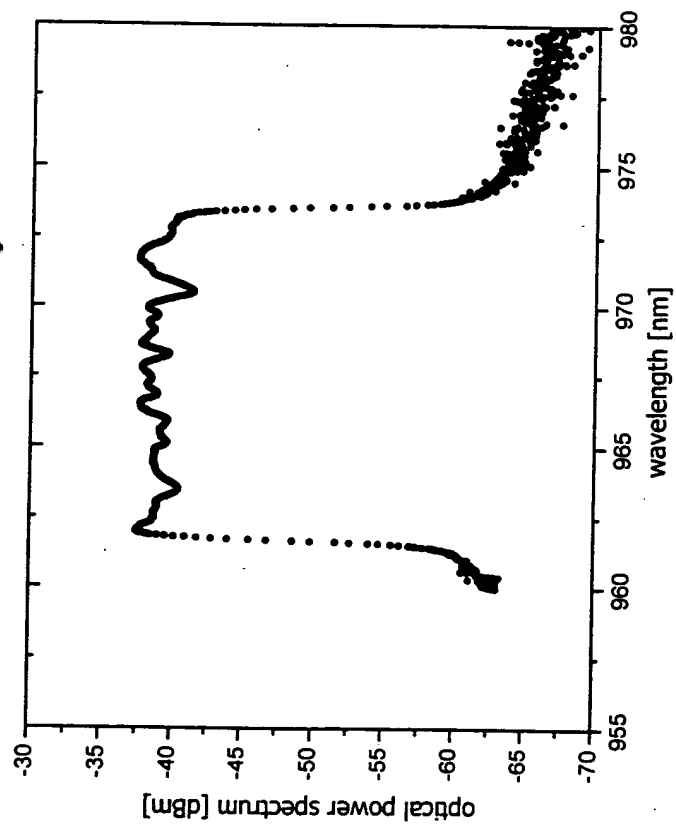


Figure 4a

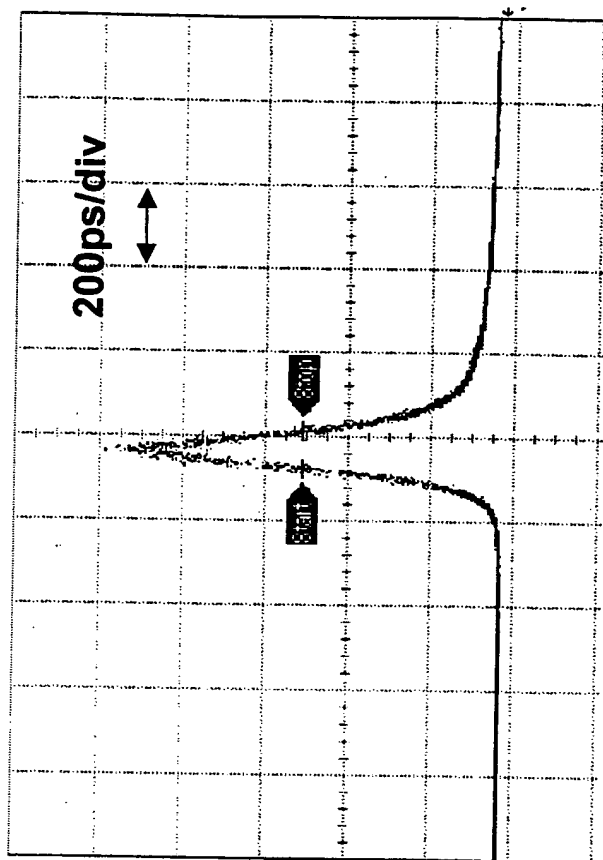


Figure 4b

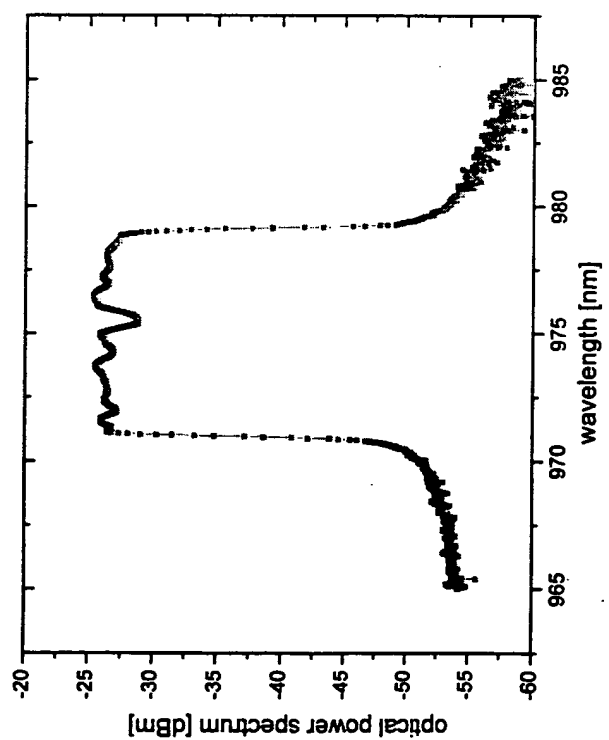


Figure 5a

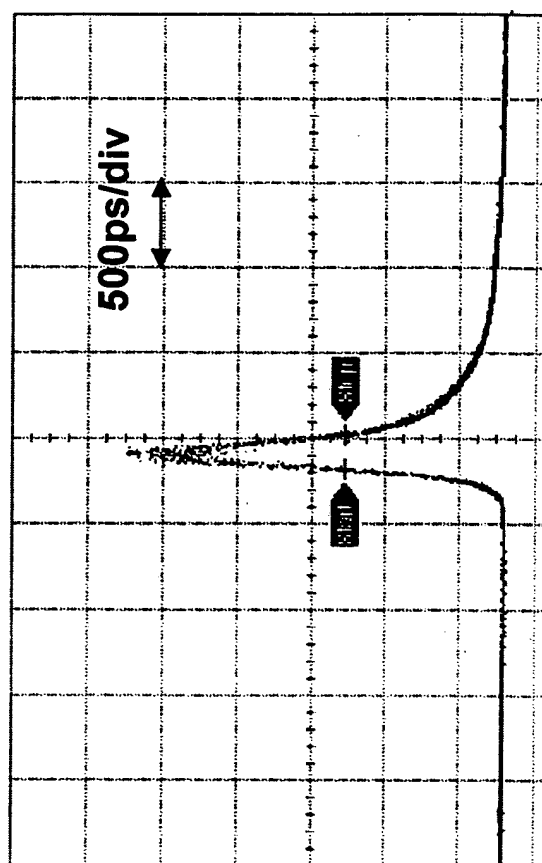


Figure 5b

Reflection

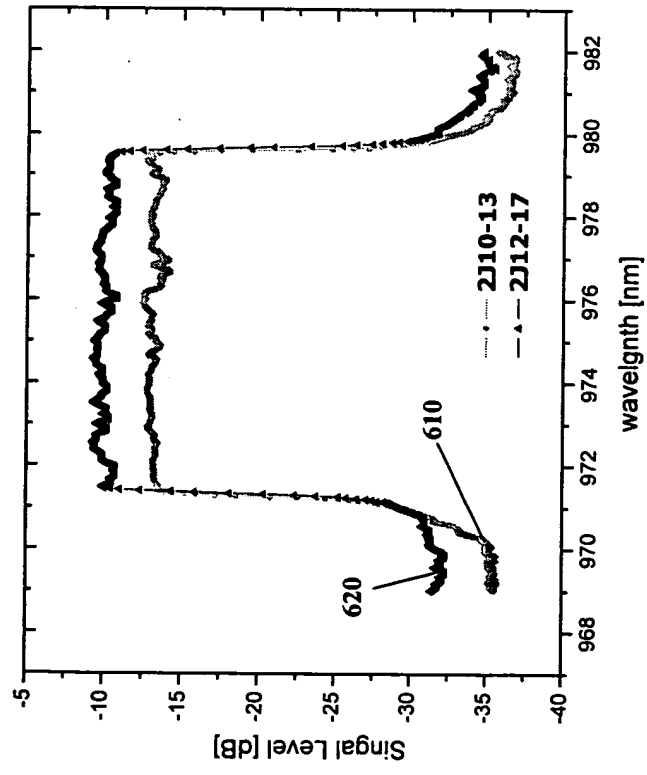


Figure 6a

Group Delay

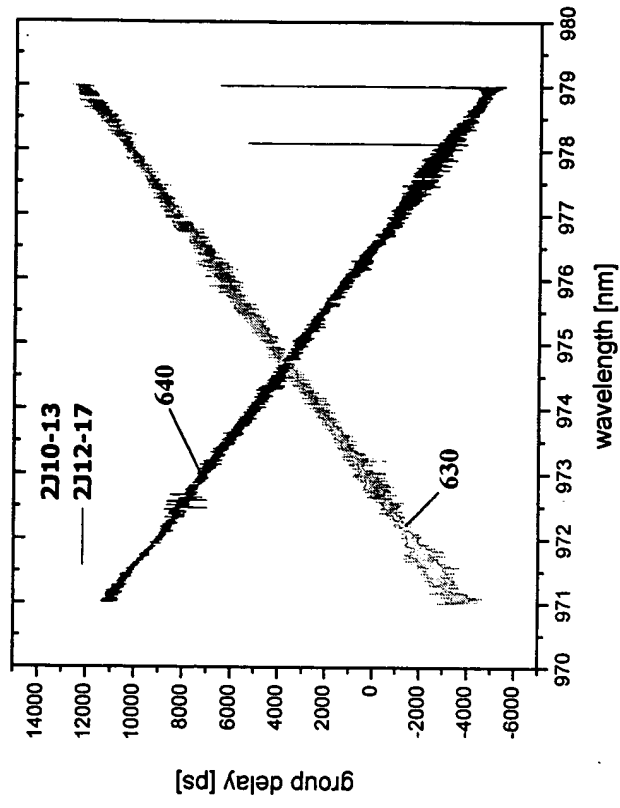


Figure 6b

# Streak camera image and reflected optical spectrum

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wavelength  
time

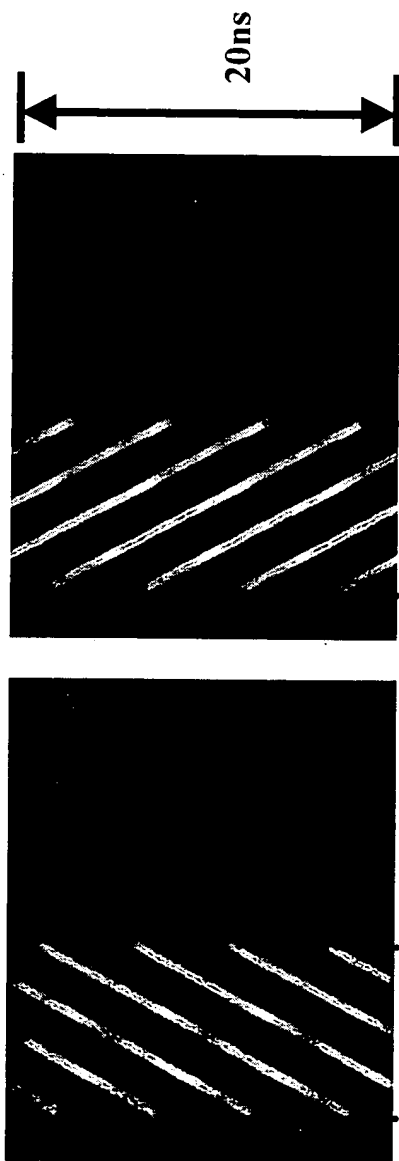


Figure 7d

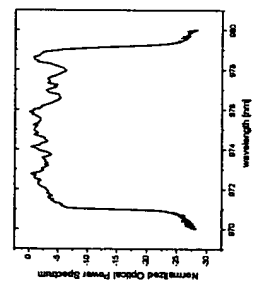


Figure 7c

Figure 7b

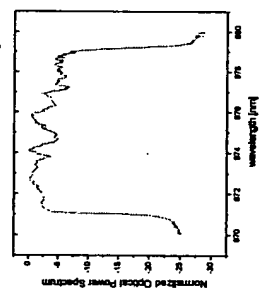


Figure 7a

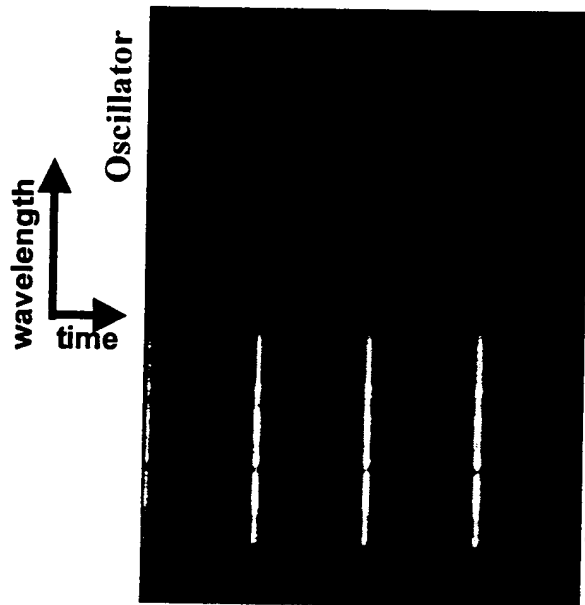


Figure 8a

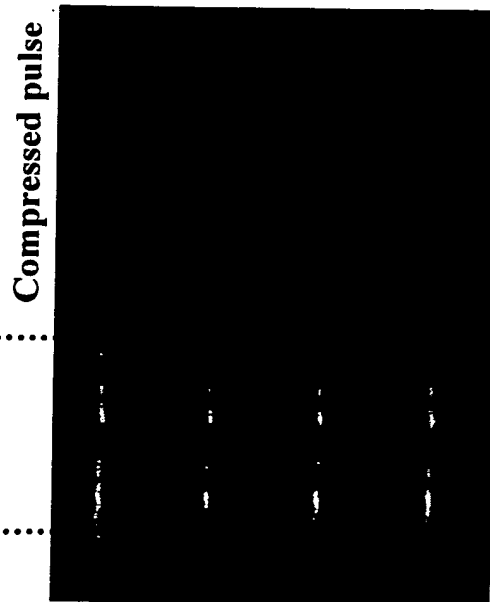


Figure 8c

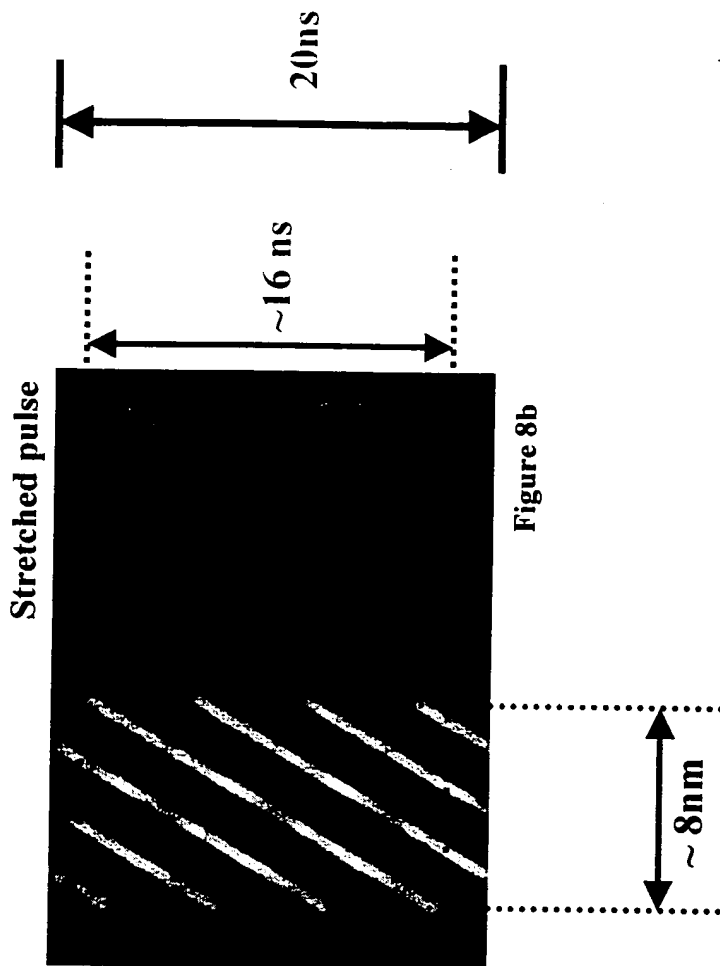


Figure 8b



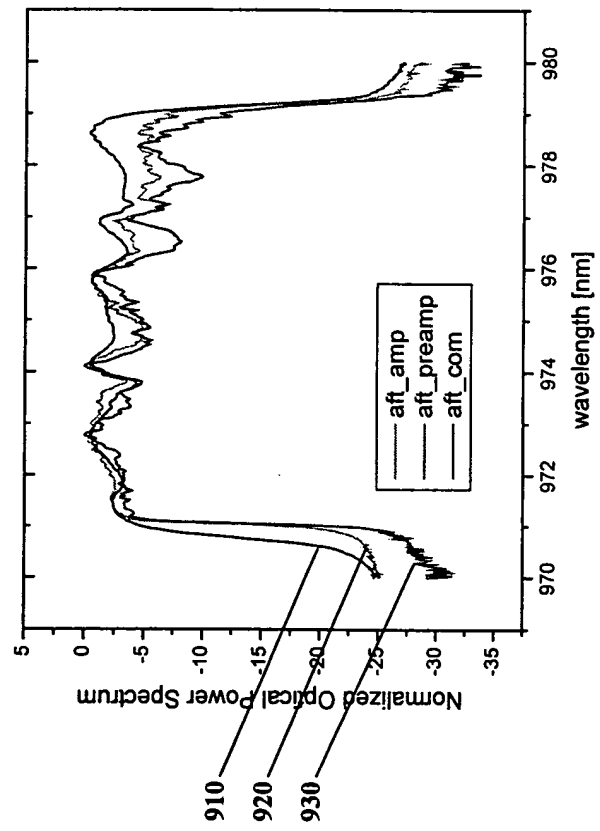


Figure 9

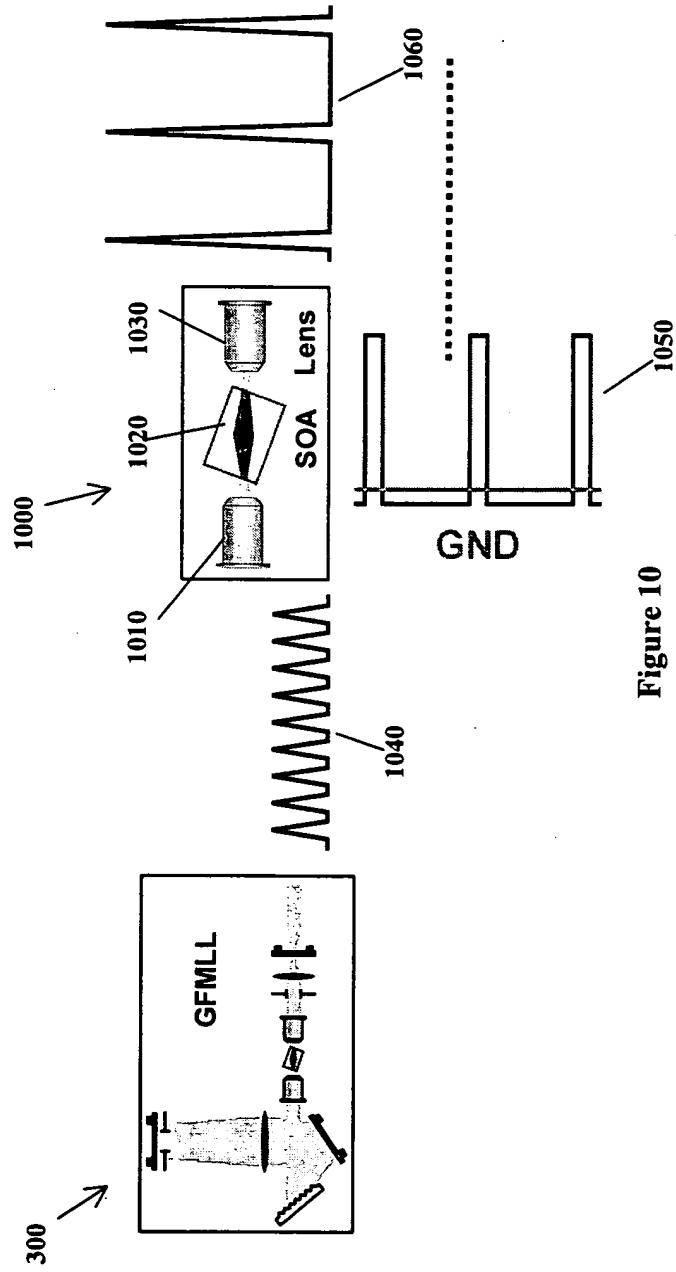


Figure 10

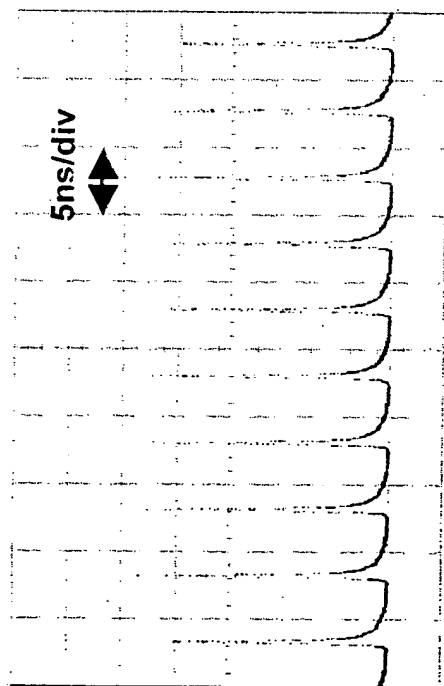


Figure 11a

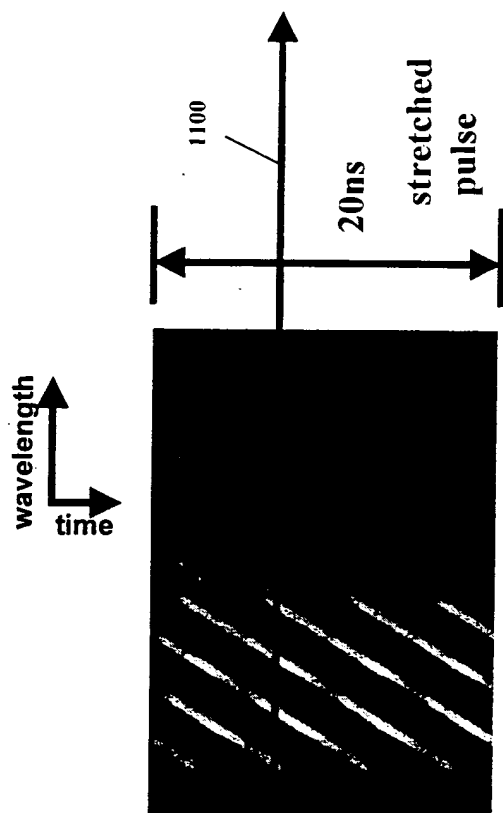


Figure 11b

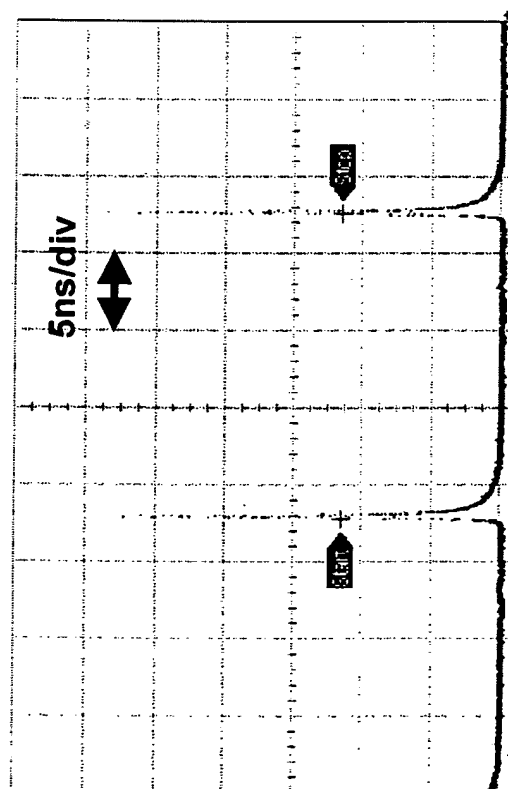


Figure 12a

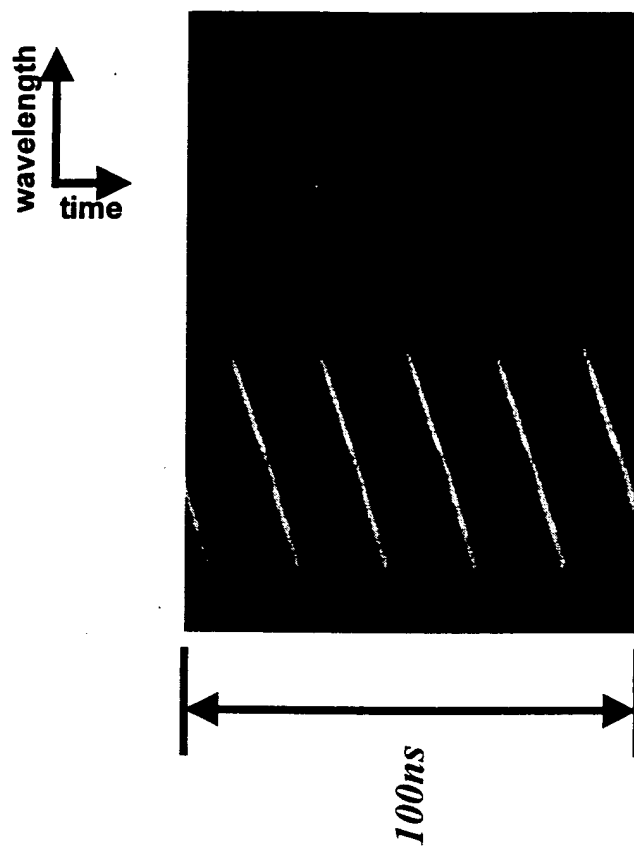
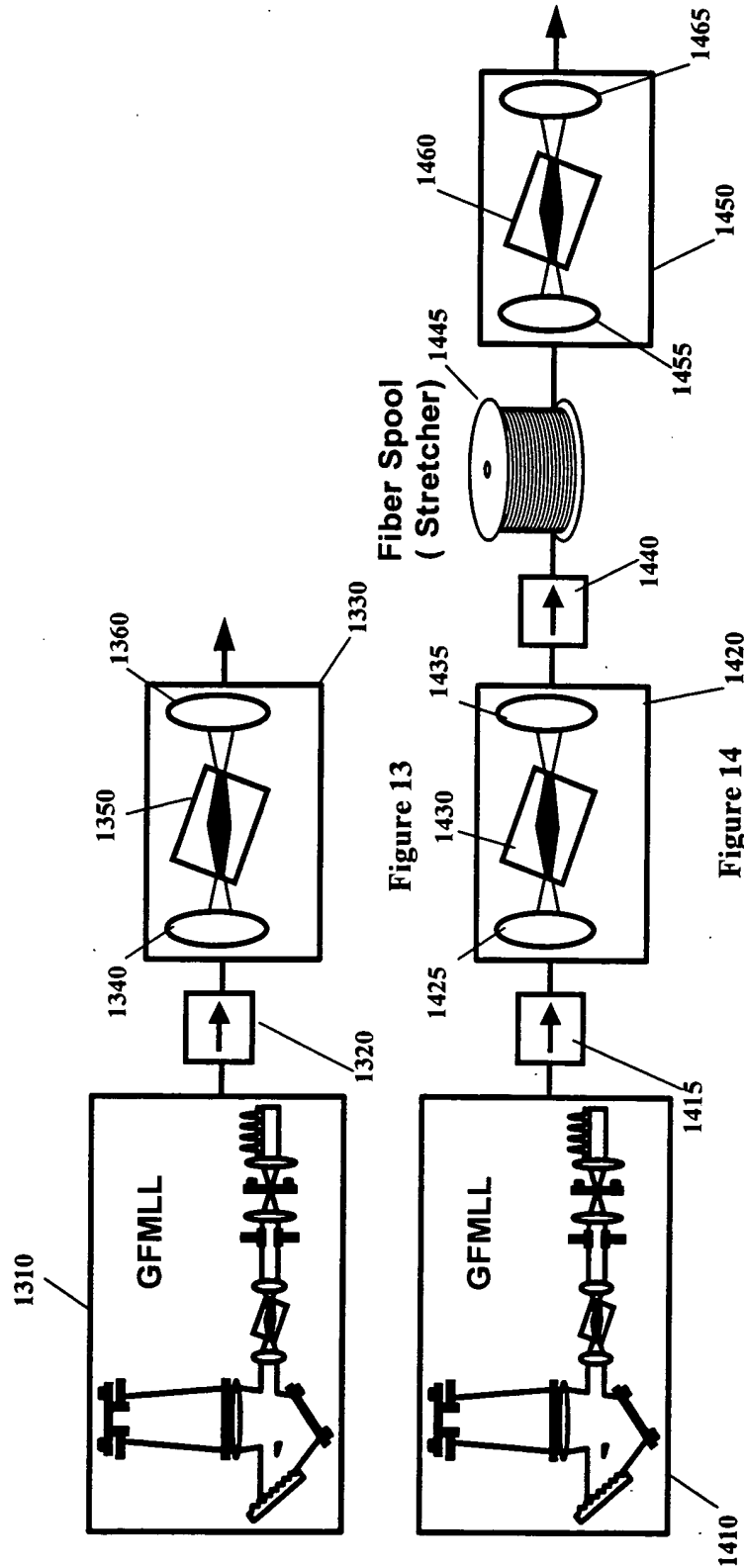


Figure 12b



wavelength  
time

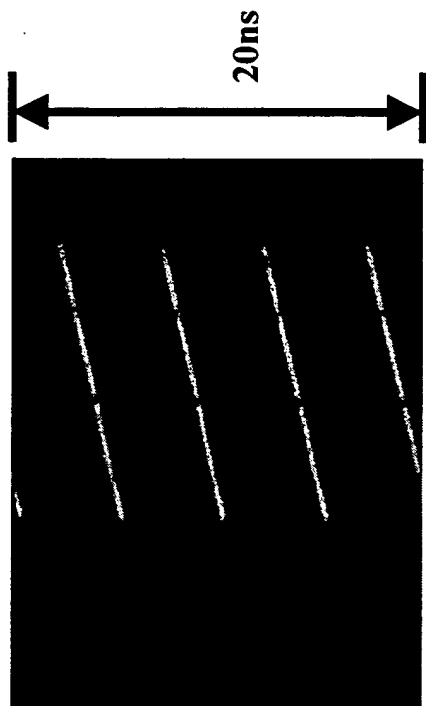


Figure 15d

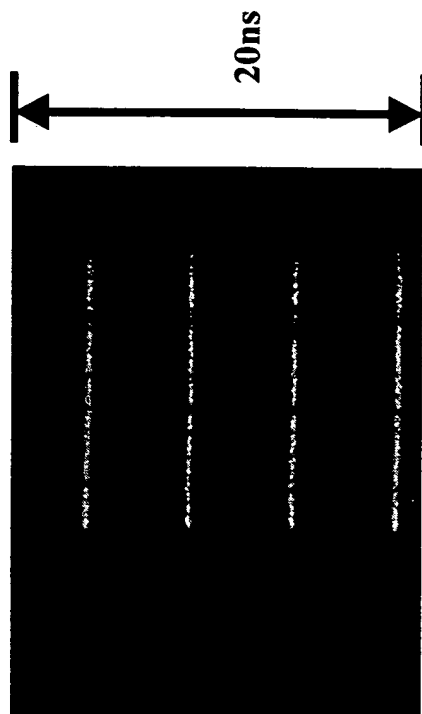


Figure 15c

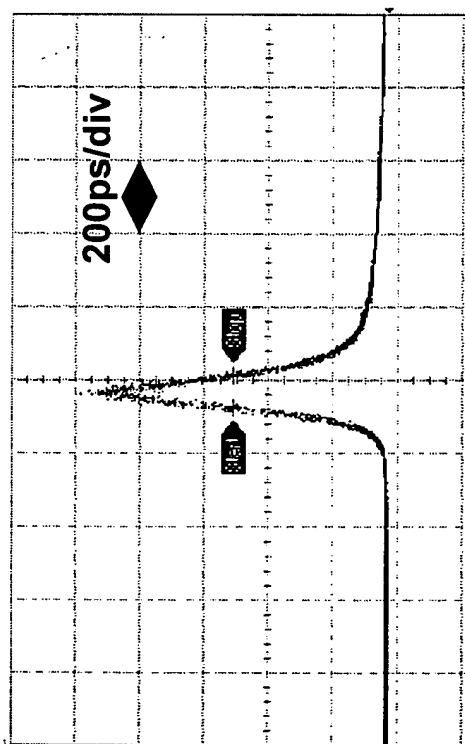


Figure 15b

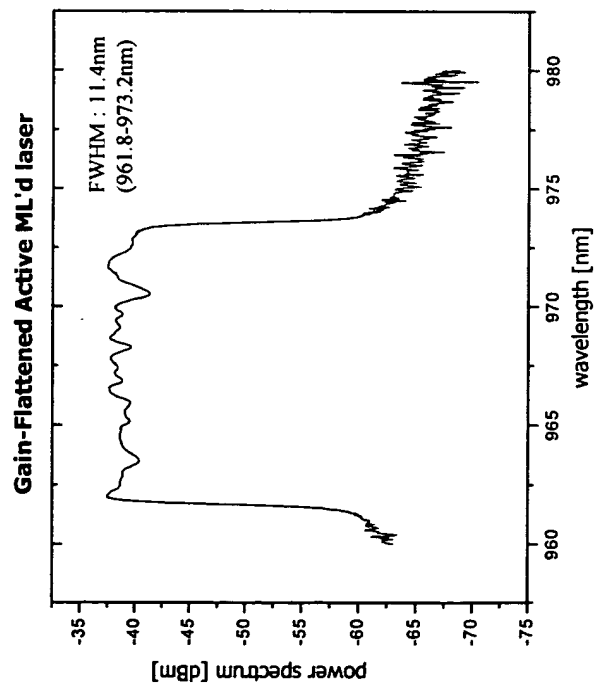


Figure 15a

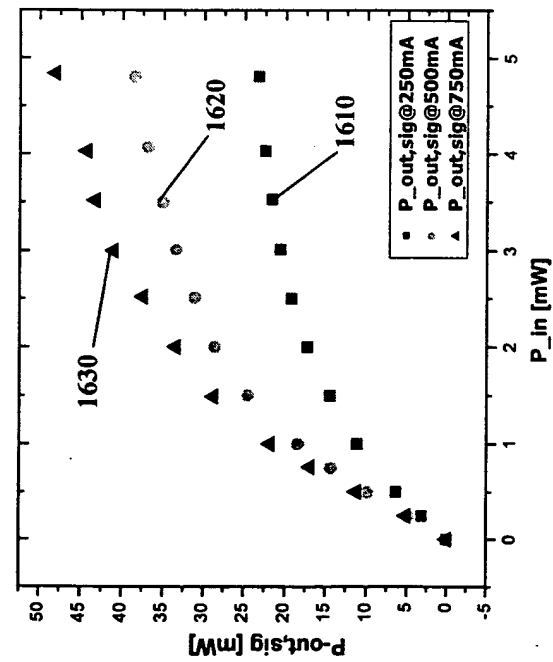


Figure 16a

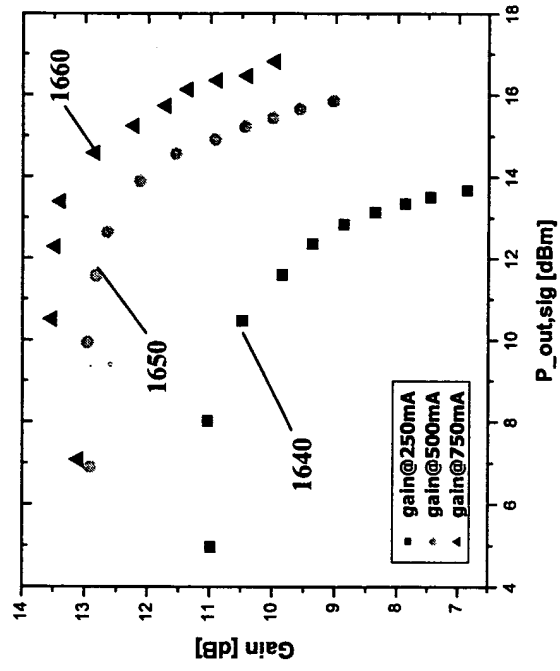


Figure 16b

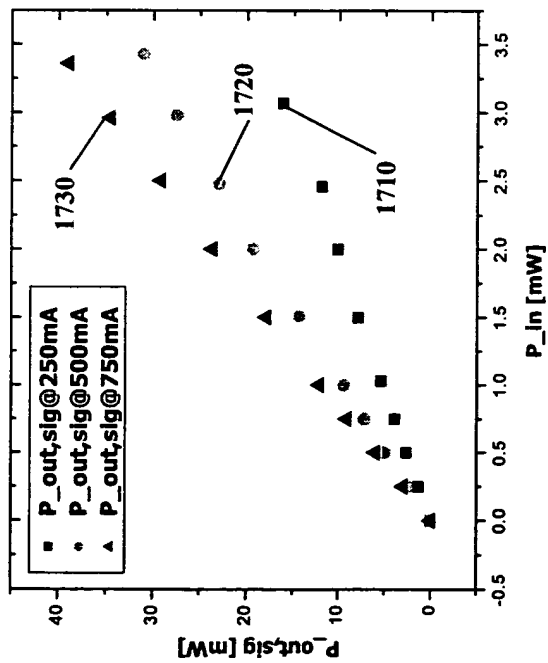


Figure 17a

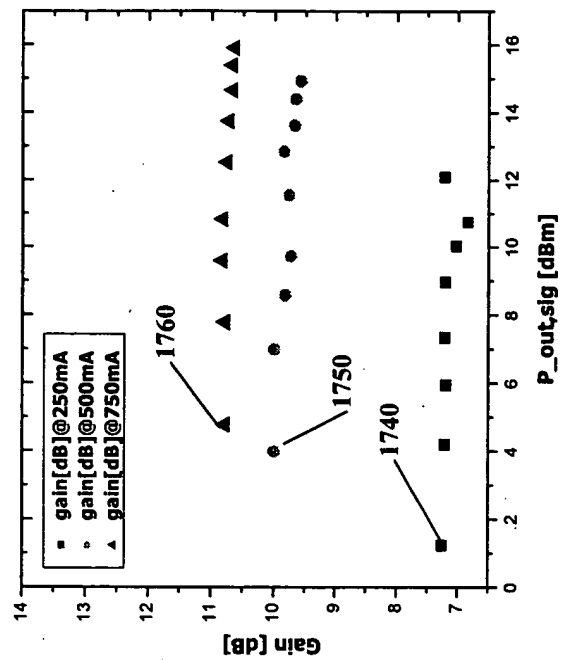


Figure 17b



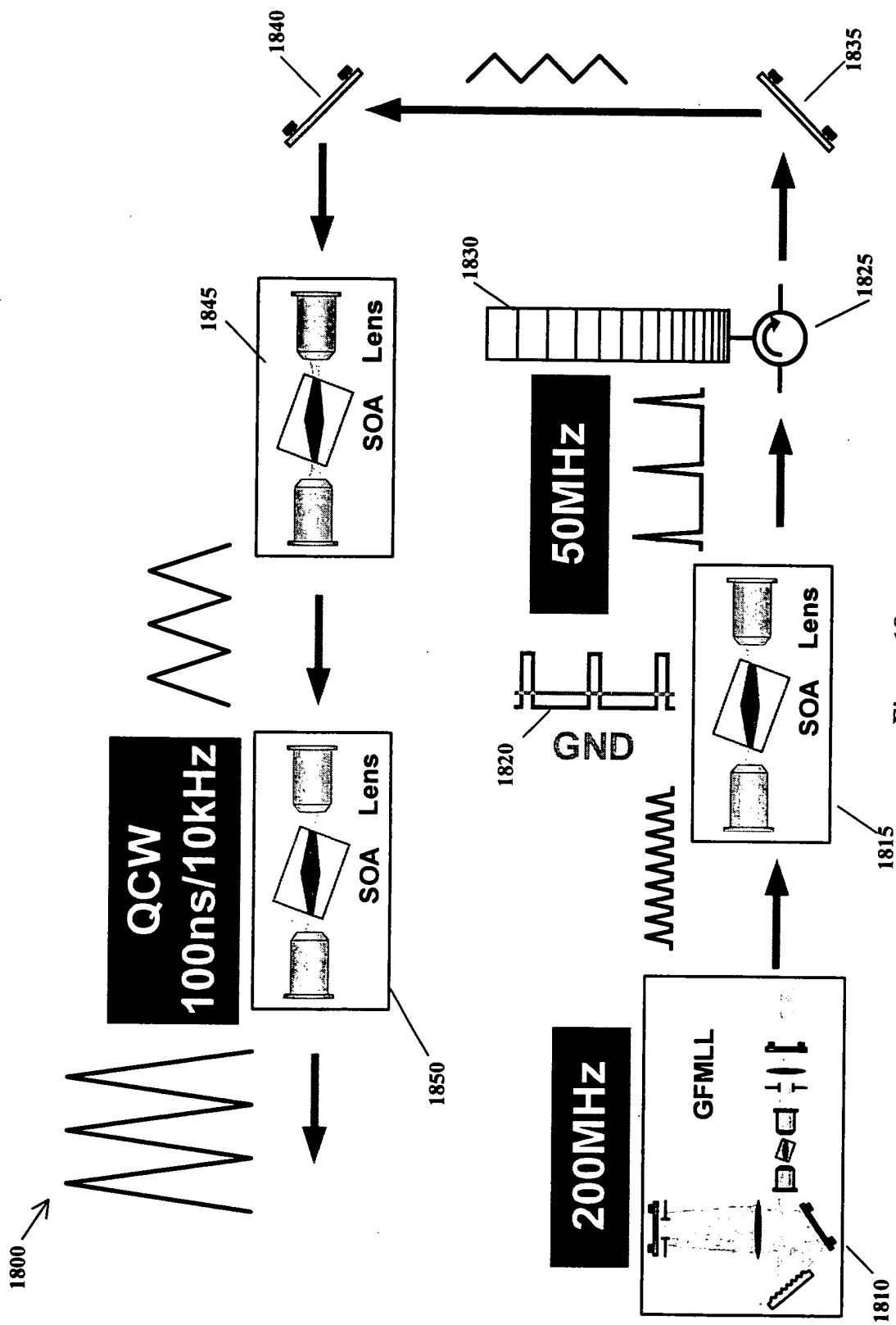


Figure 18a

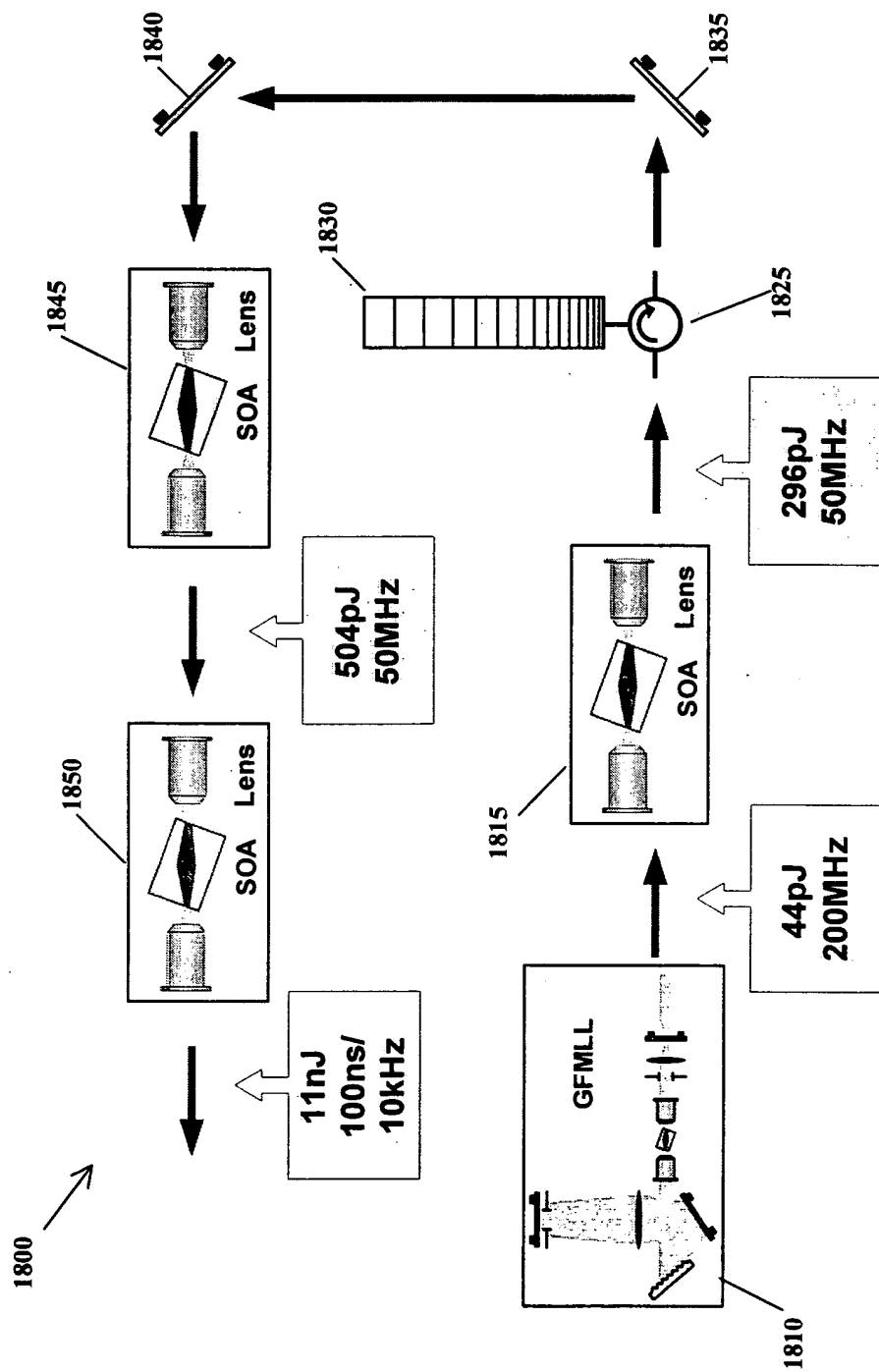


Figure 18b

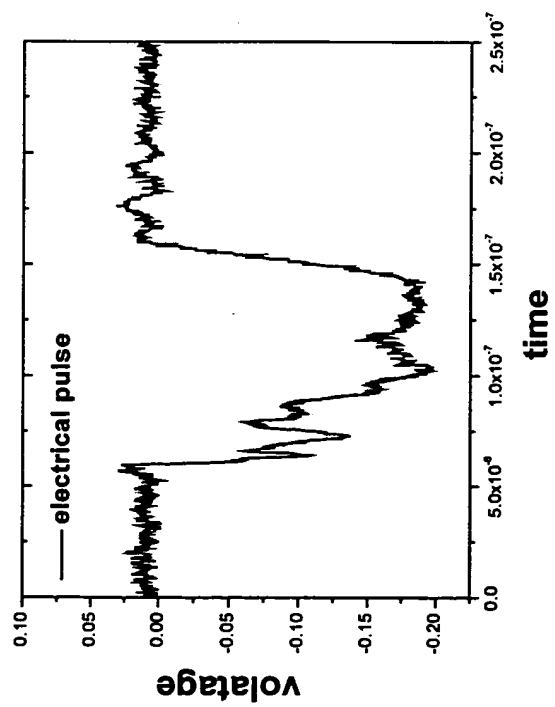


Figure 19a

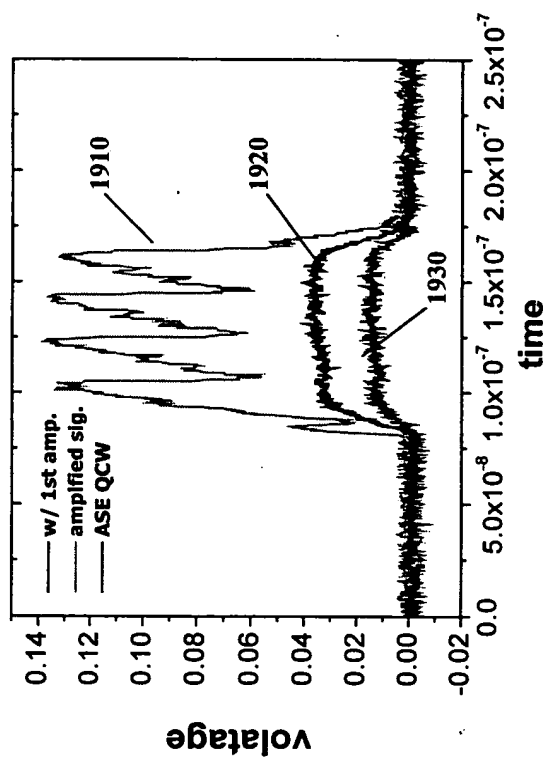


Figure 19b

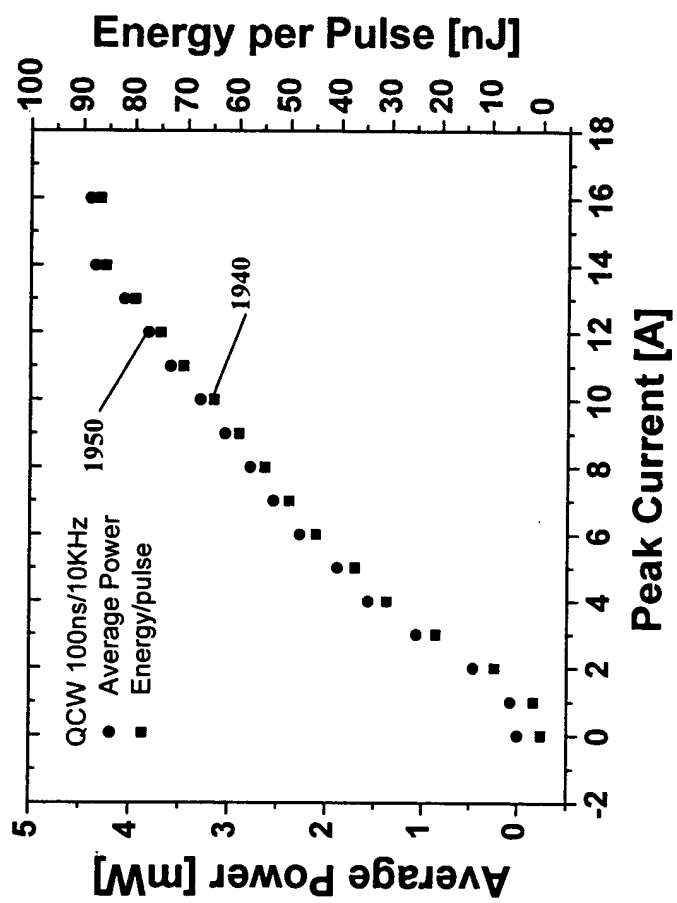


Figure 19c

2000

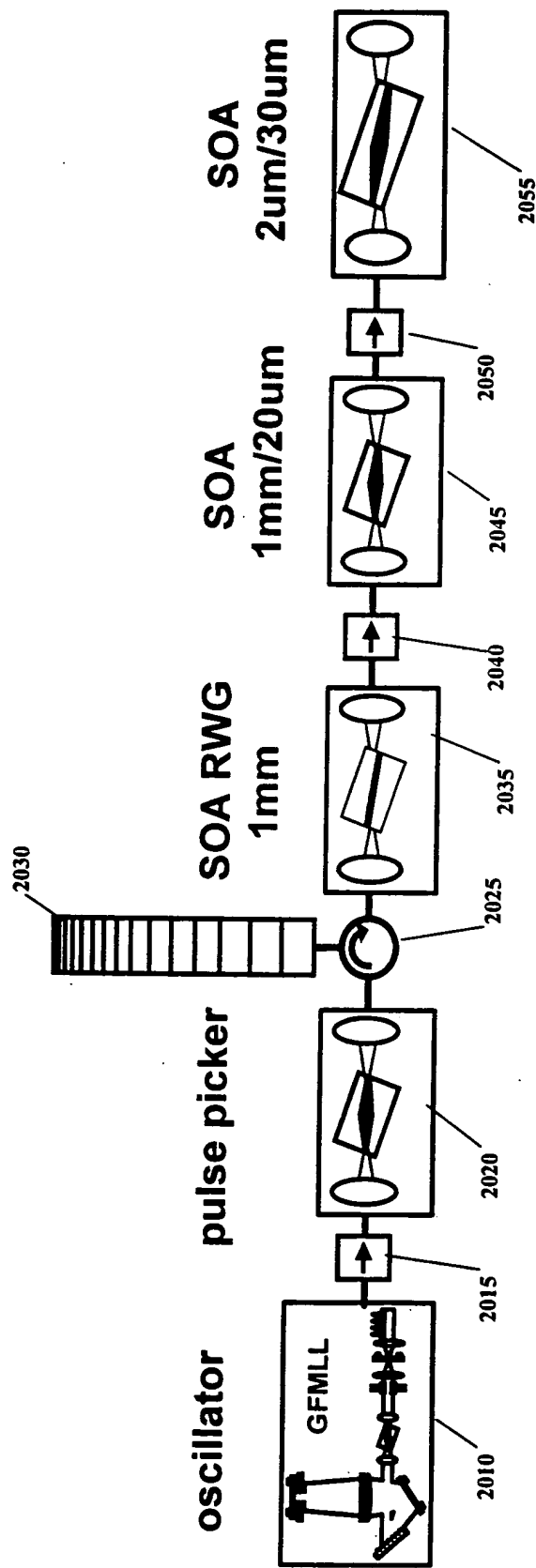


Figure 20a

	operating condition	average power	energy per pulse	gain/loss
oscillator	200MHz	~7mW	35pJ	
pulse picker	50MHz 250mA+44mV	12mW	240pJ	8.34dB
stretcher		1.6mW	32pJ	-8.75dB
preamplifier	125mA DC	16.3mW	326pJ	10.1dB
1 <sup>st</sup> amplifier	500mA DC	162mW	3.24nJ	9.97dB
2 <sup>nd</sup> amplifier	16A peak 100ns/10kHz	3.8mW	76nJ	13.7dB
total gain ~ 33.3 dB				

Figure 20b

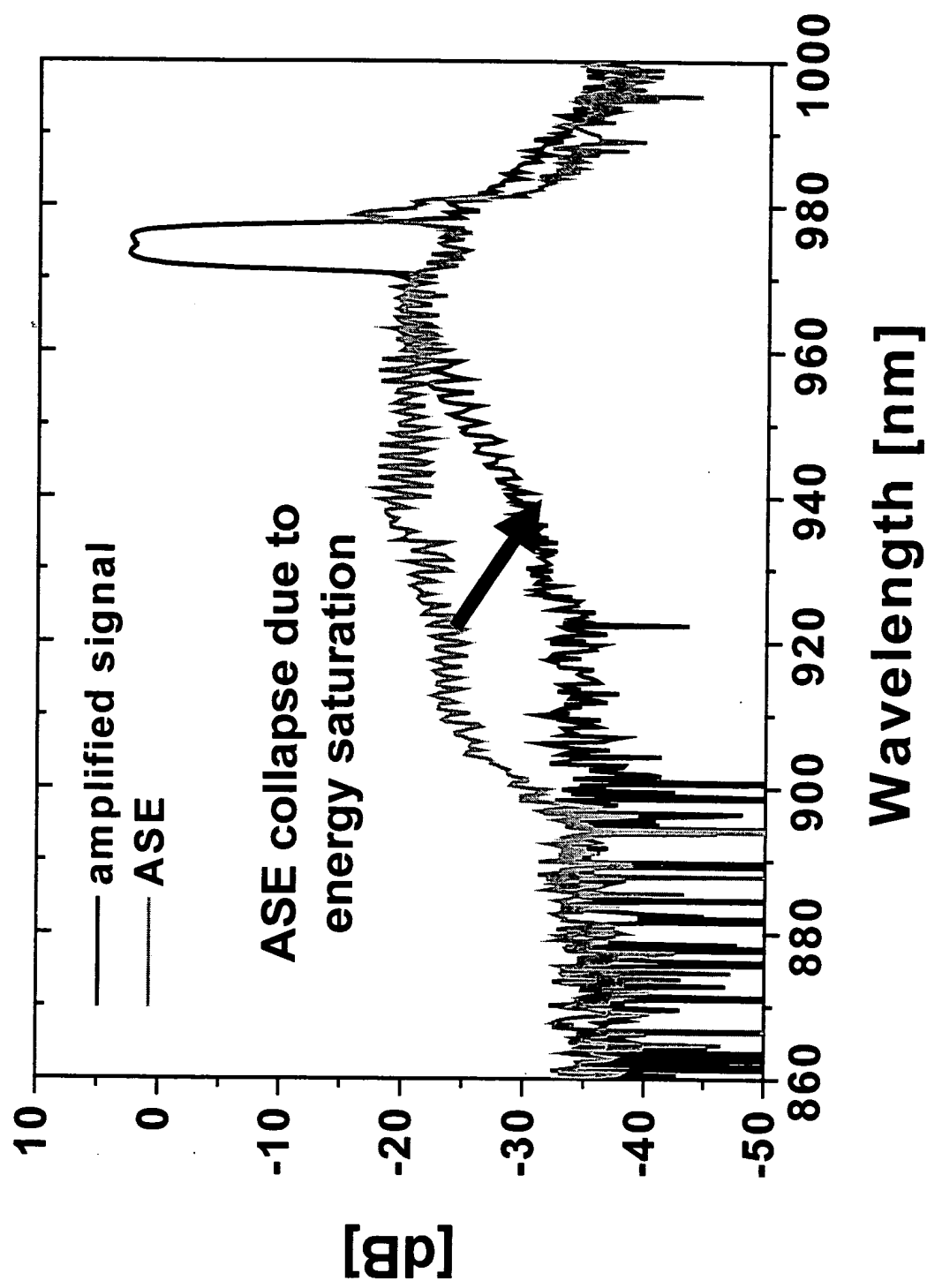


Figure 20c

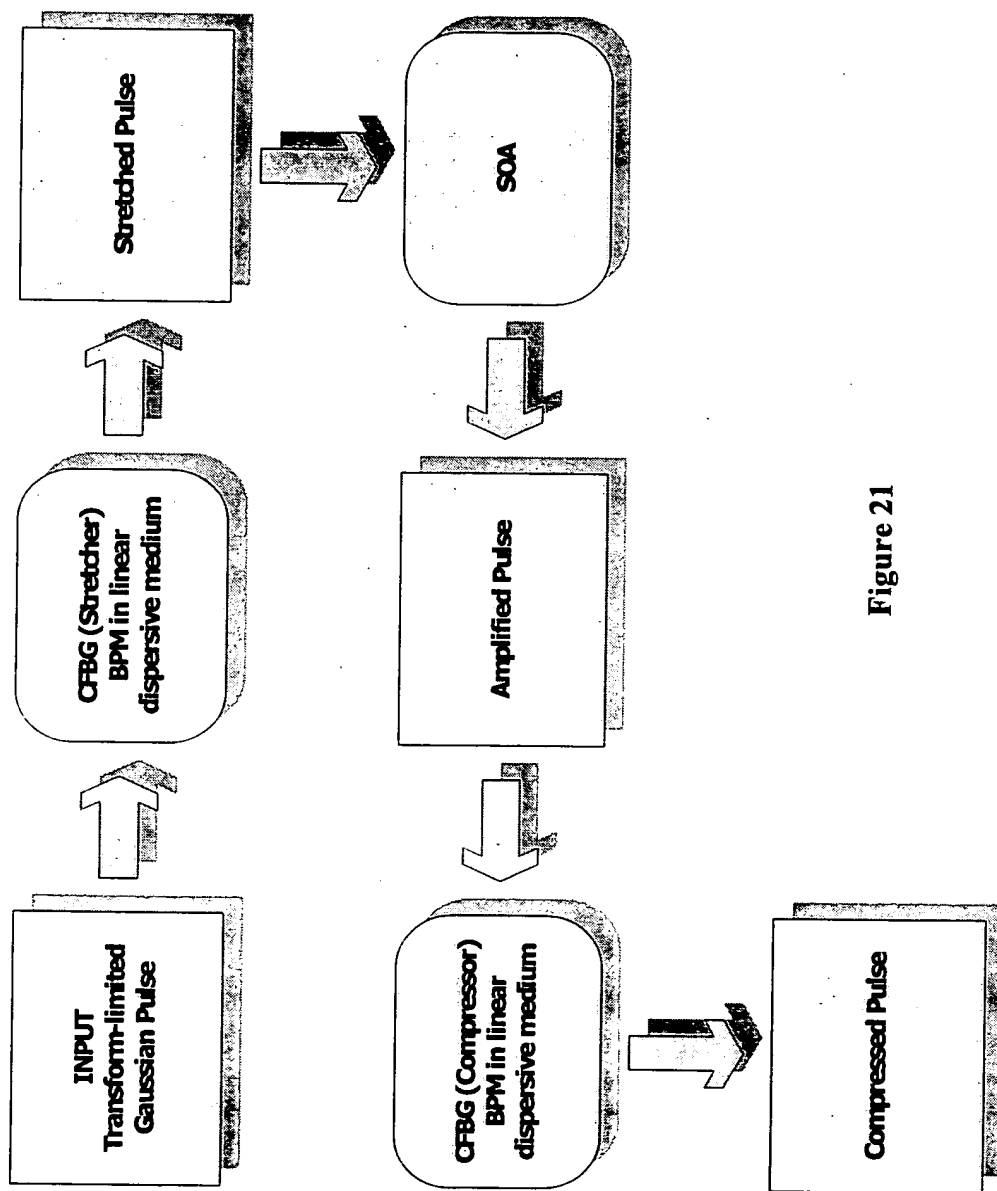
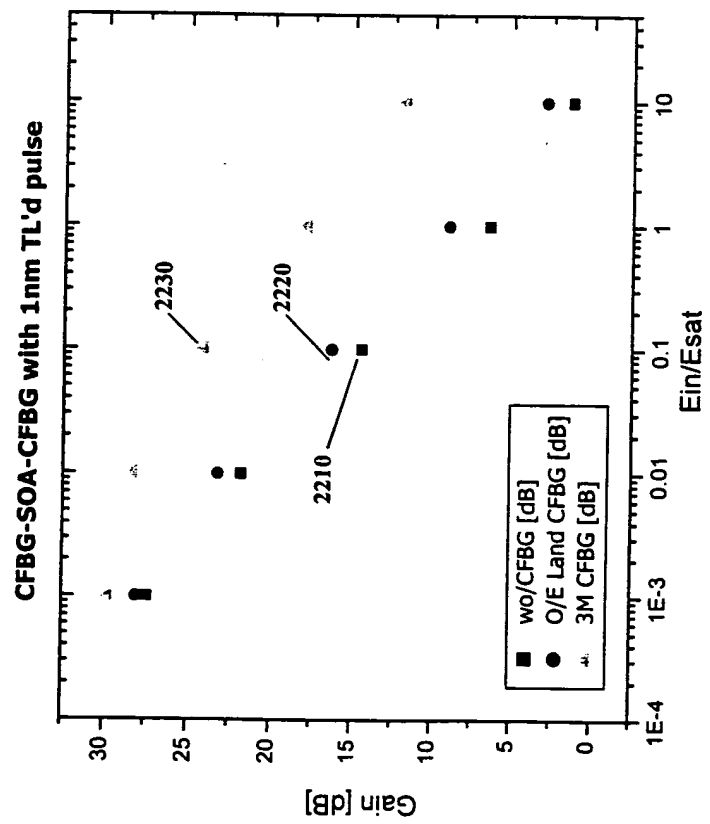
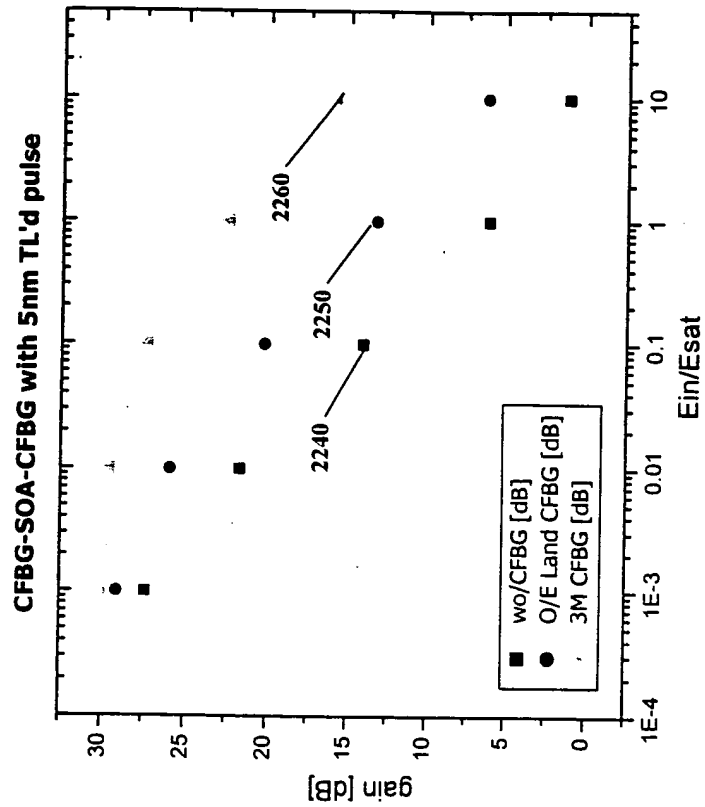


Figure 21





**Figure 22a**



**Figure 22b**

2300 ↗

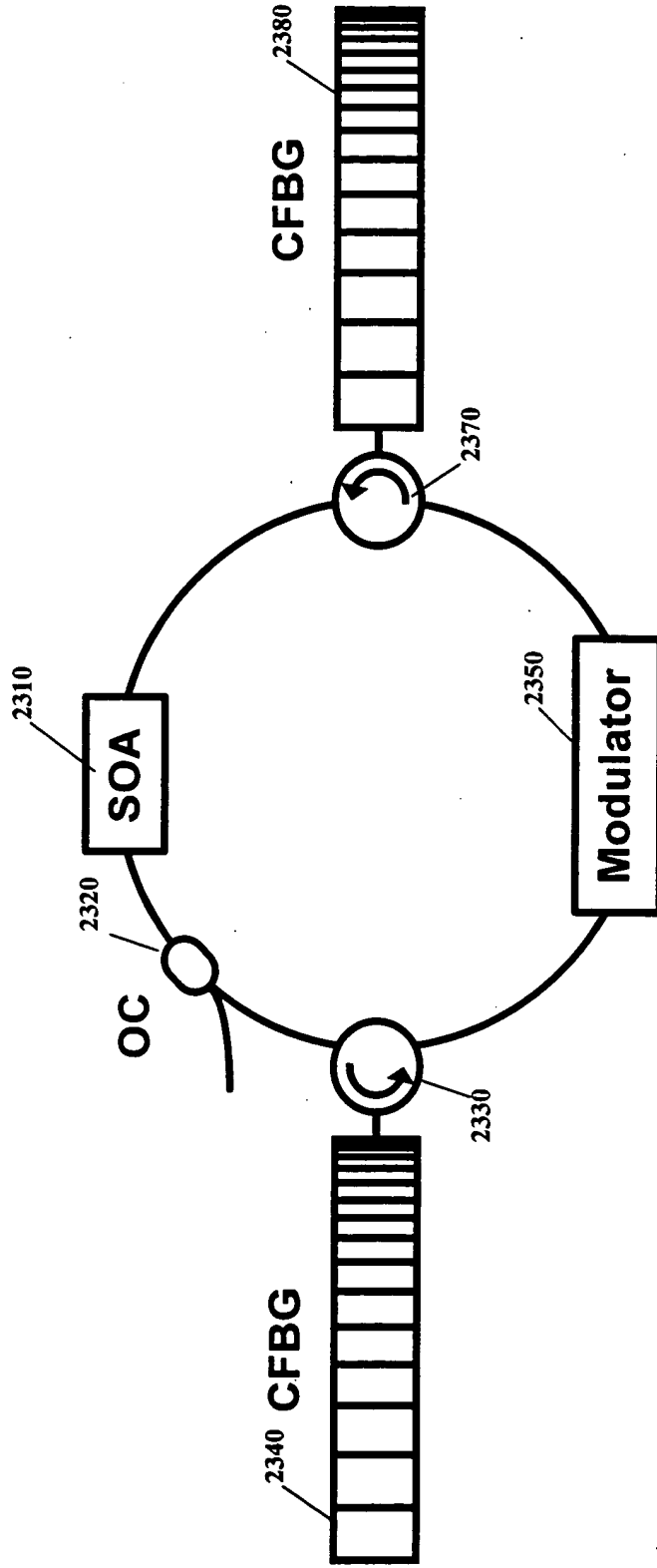
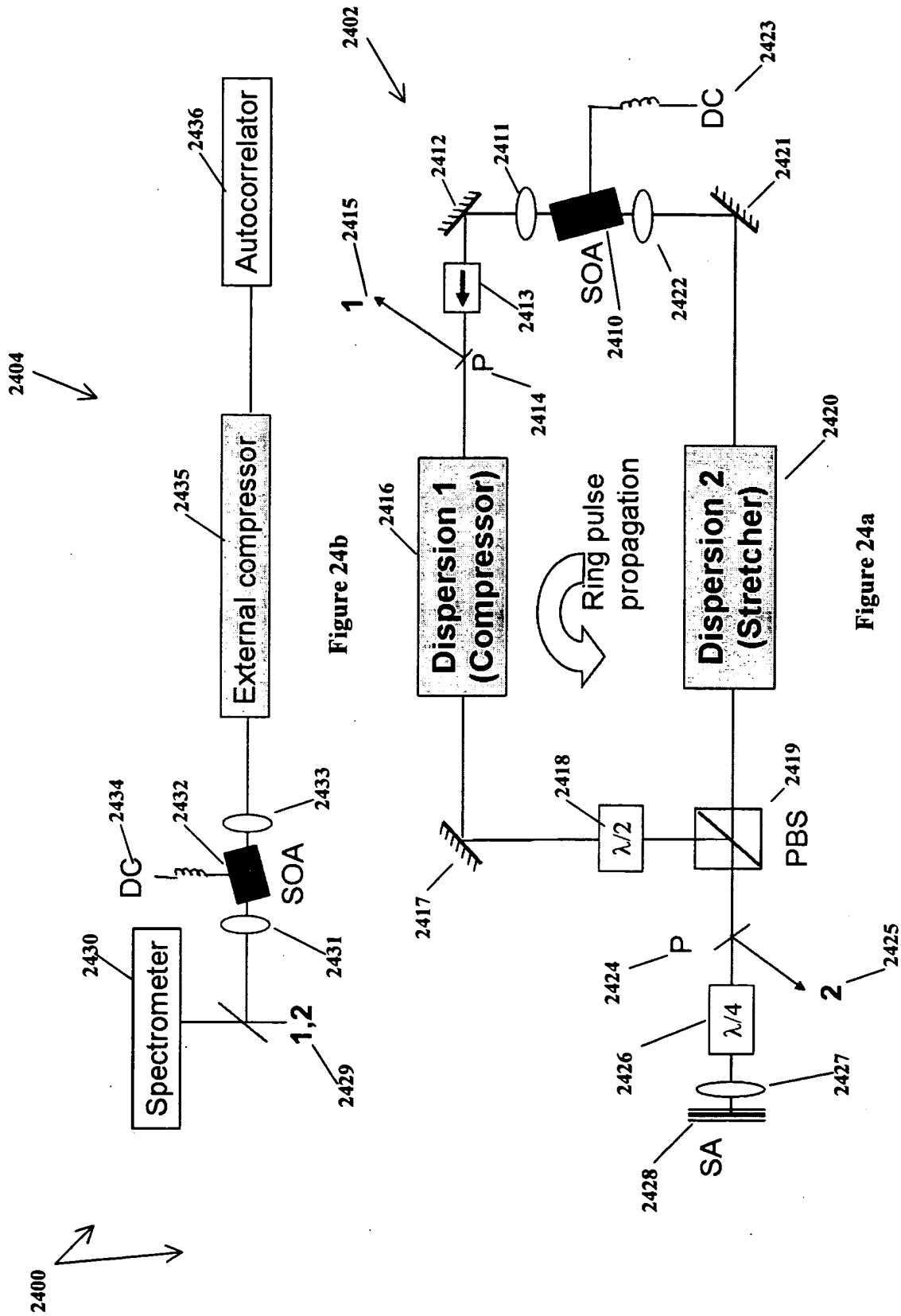


Figure 23



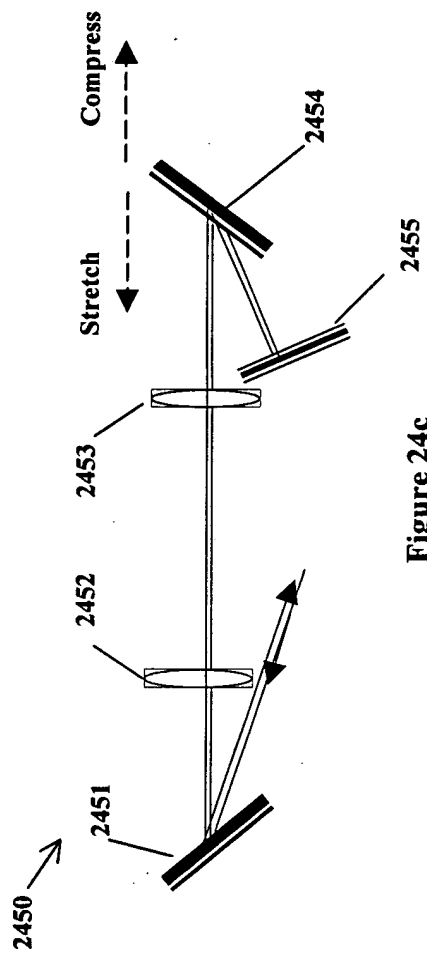


Figure 24c

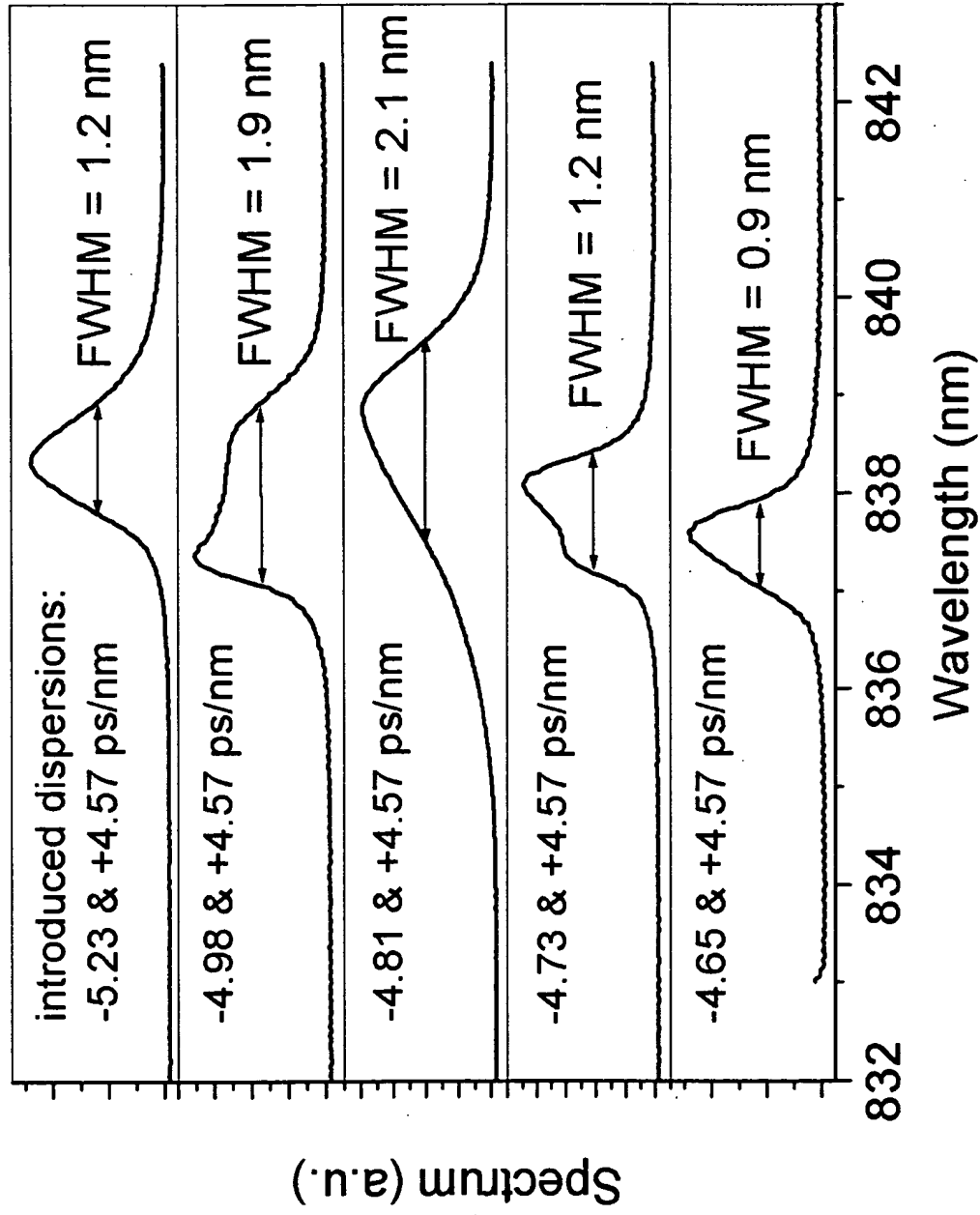


Figure 25

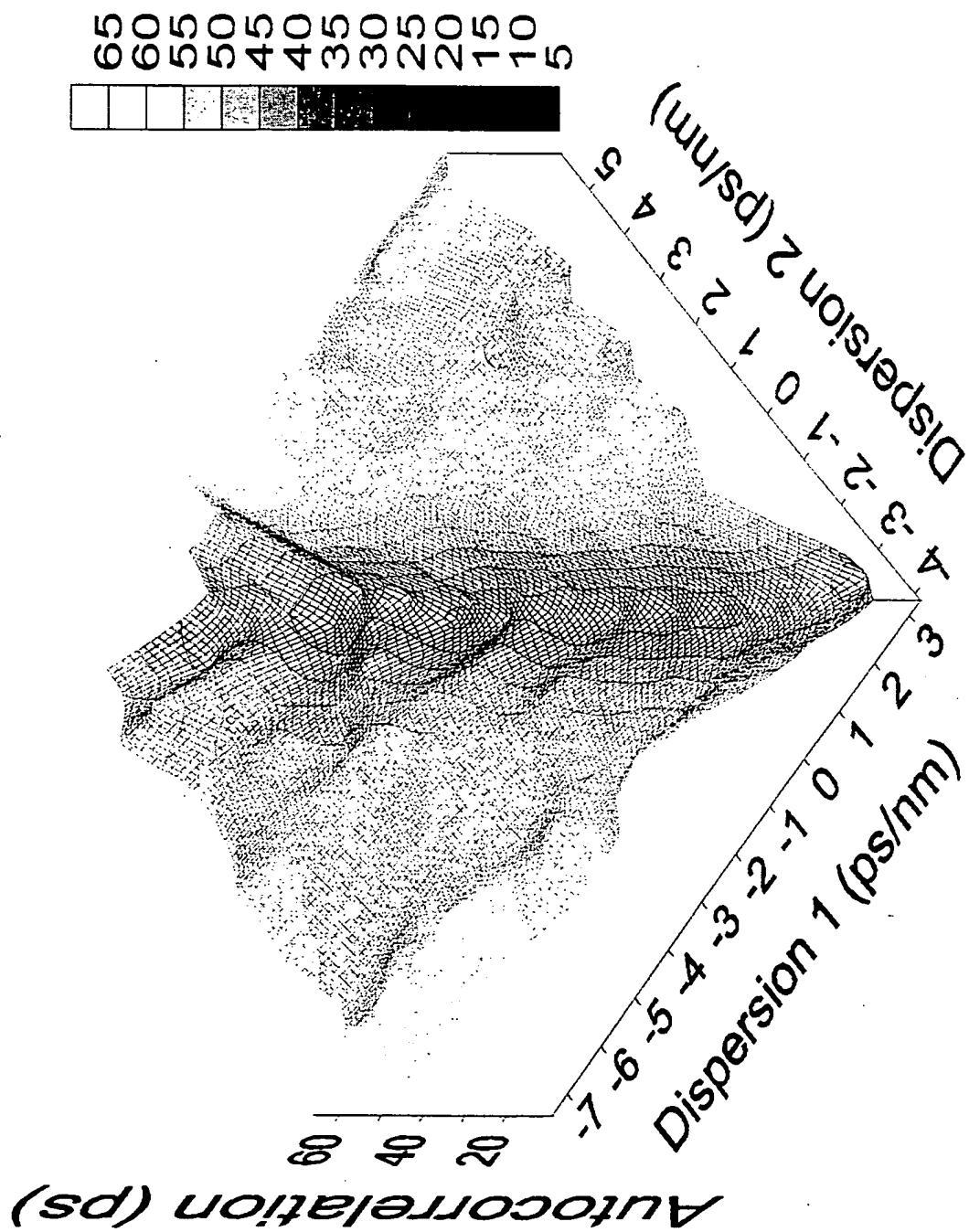


Figure 26

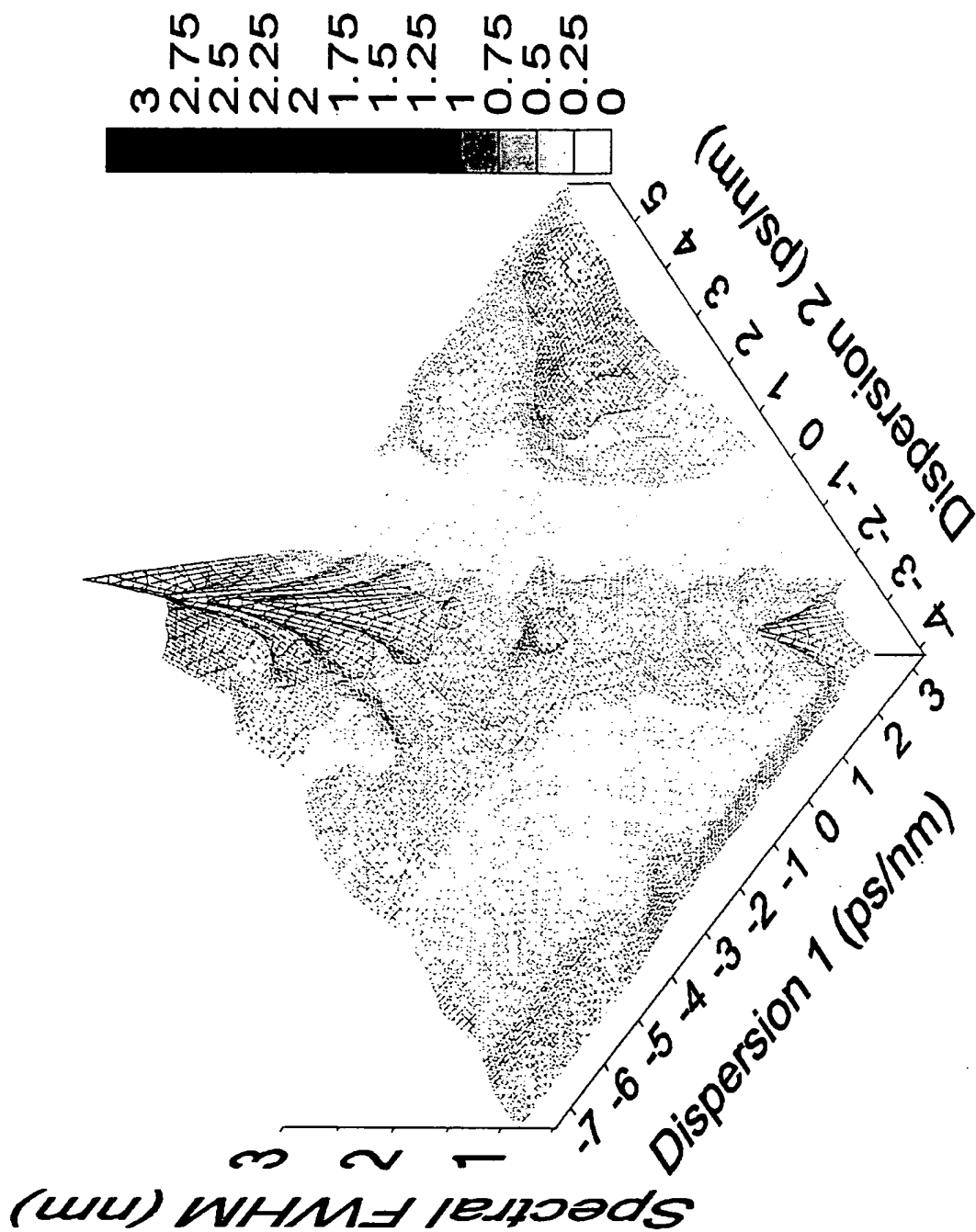


Figure 27

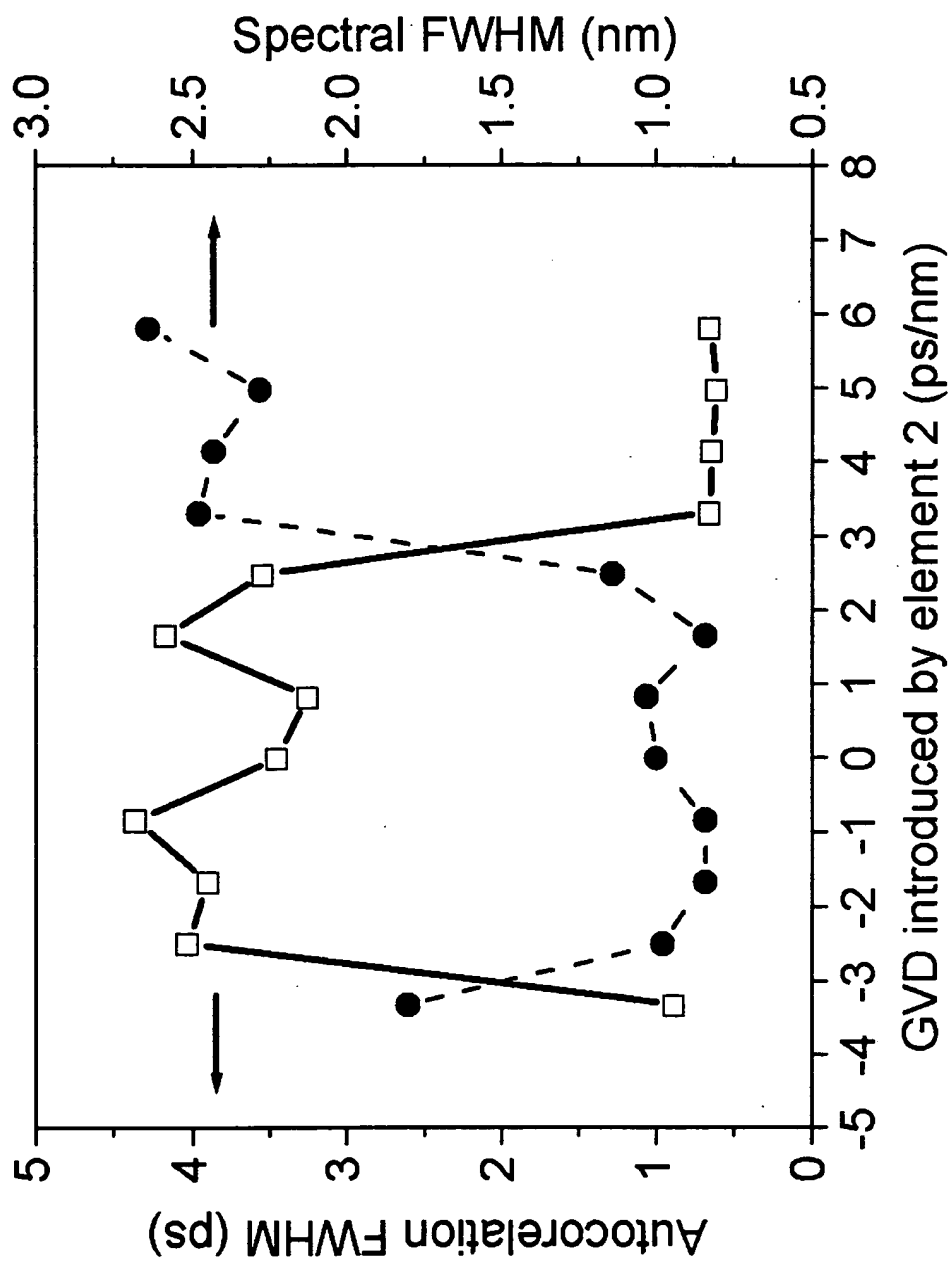


Figure 28



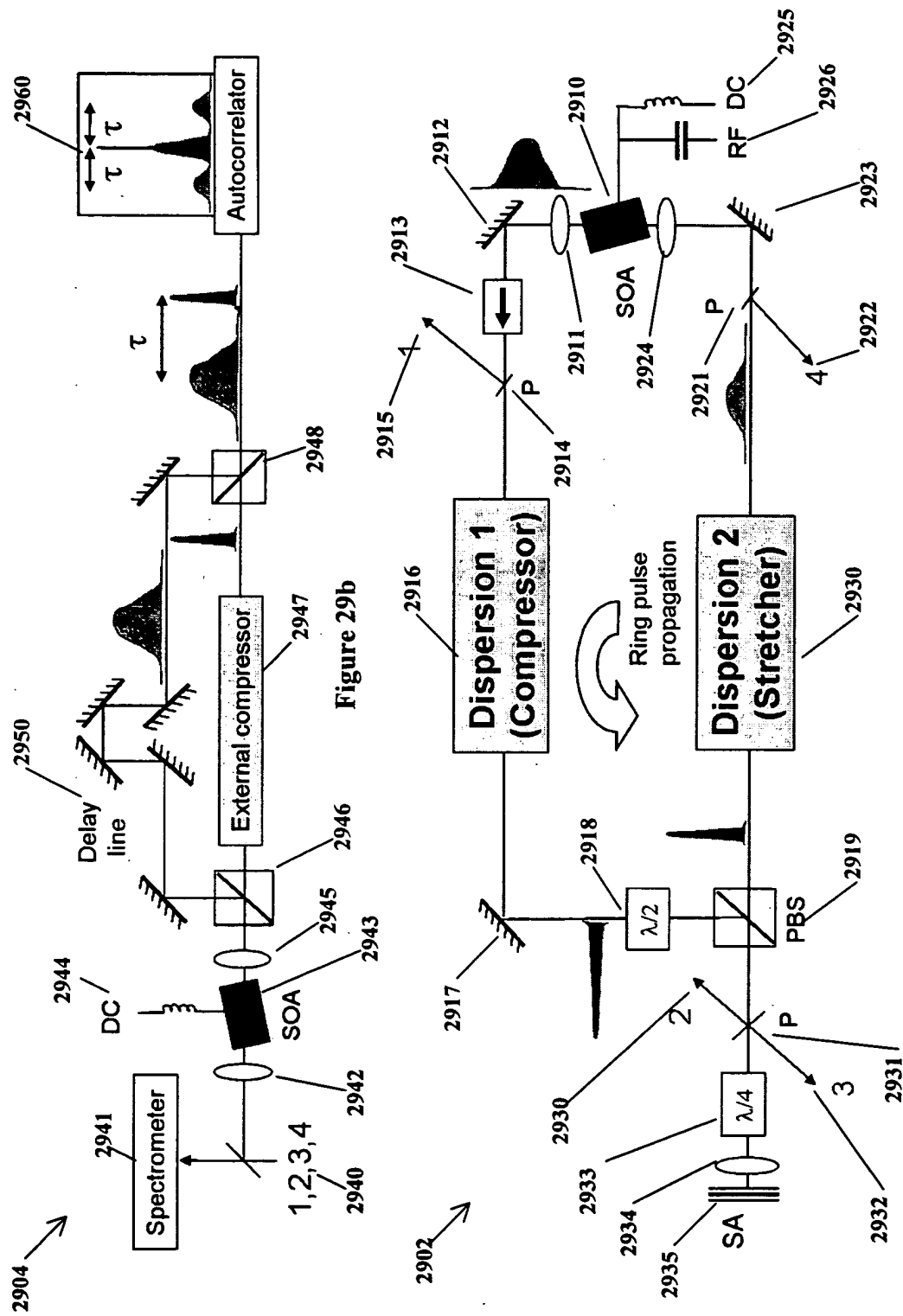


Figure 29a

Figure 29b

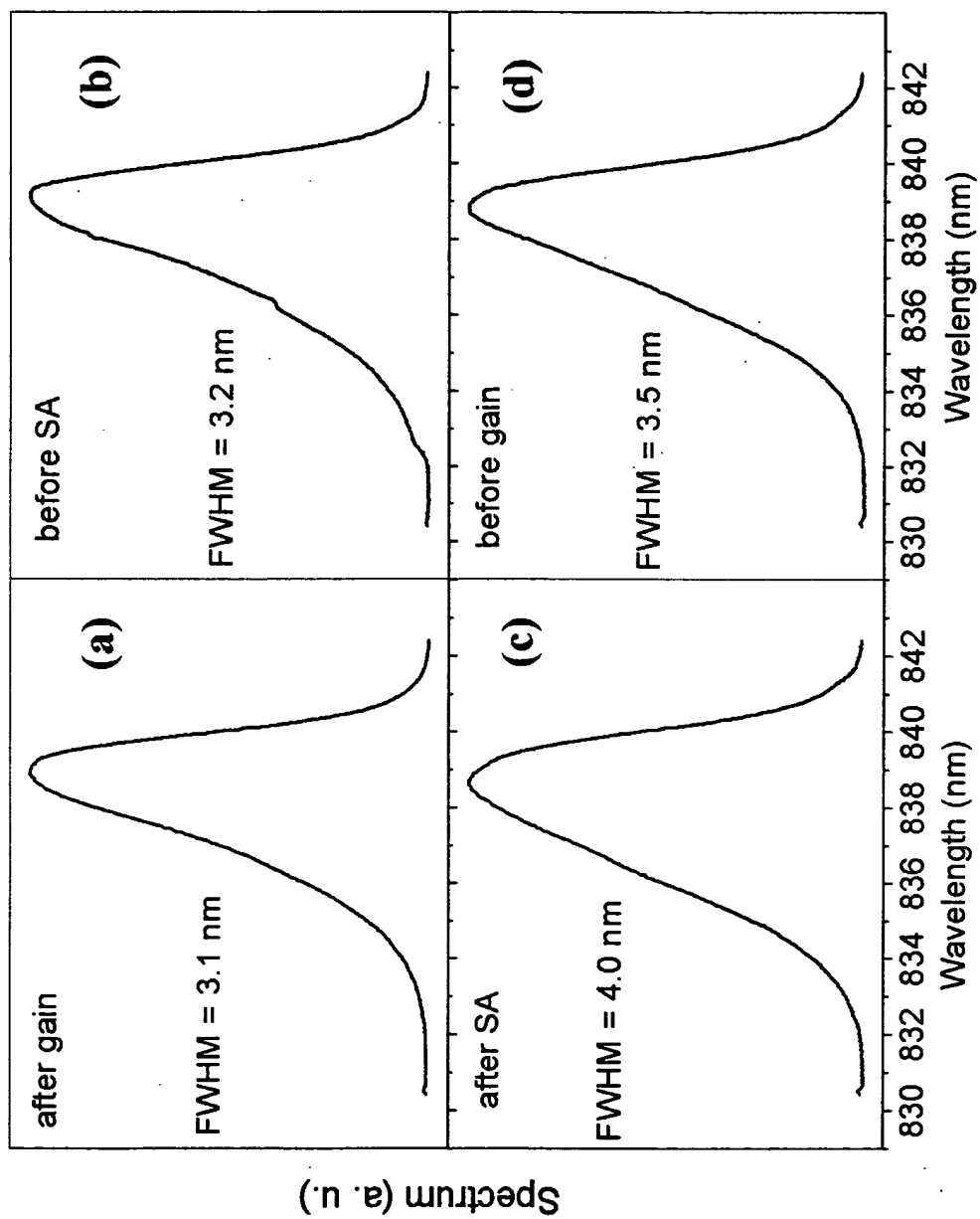


Figure 30

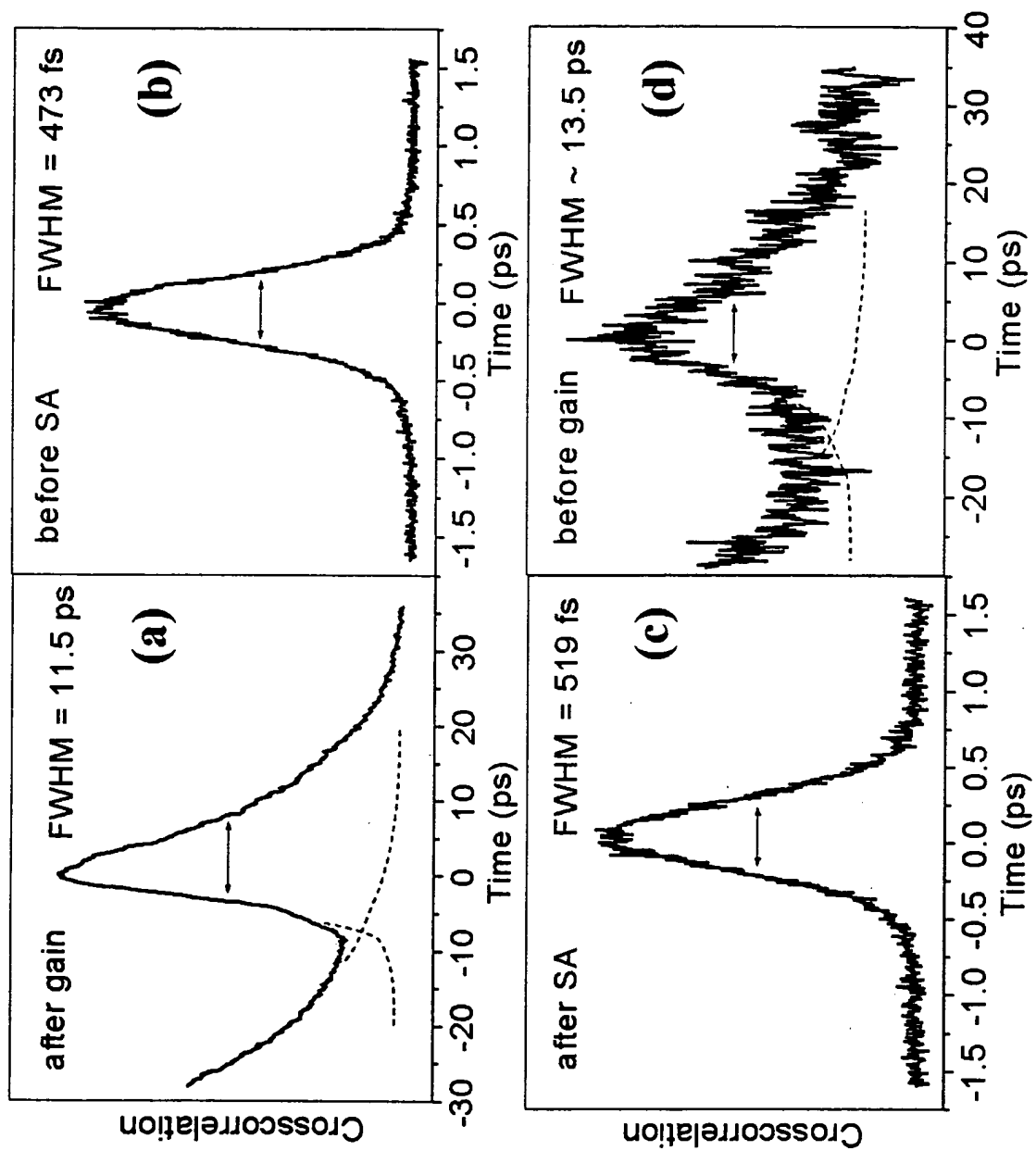


Figure 31

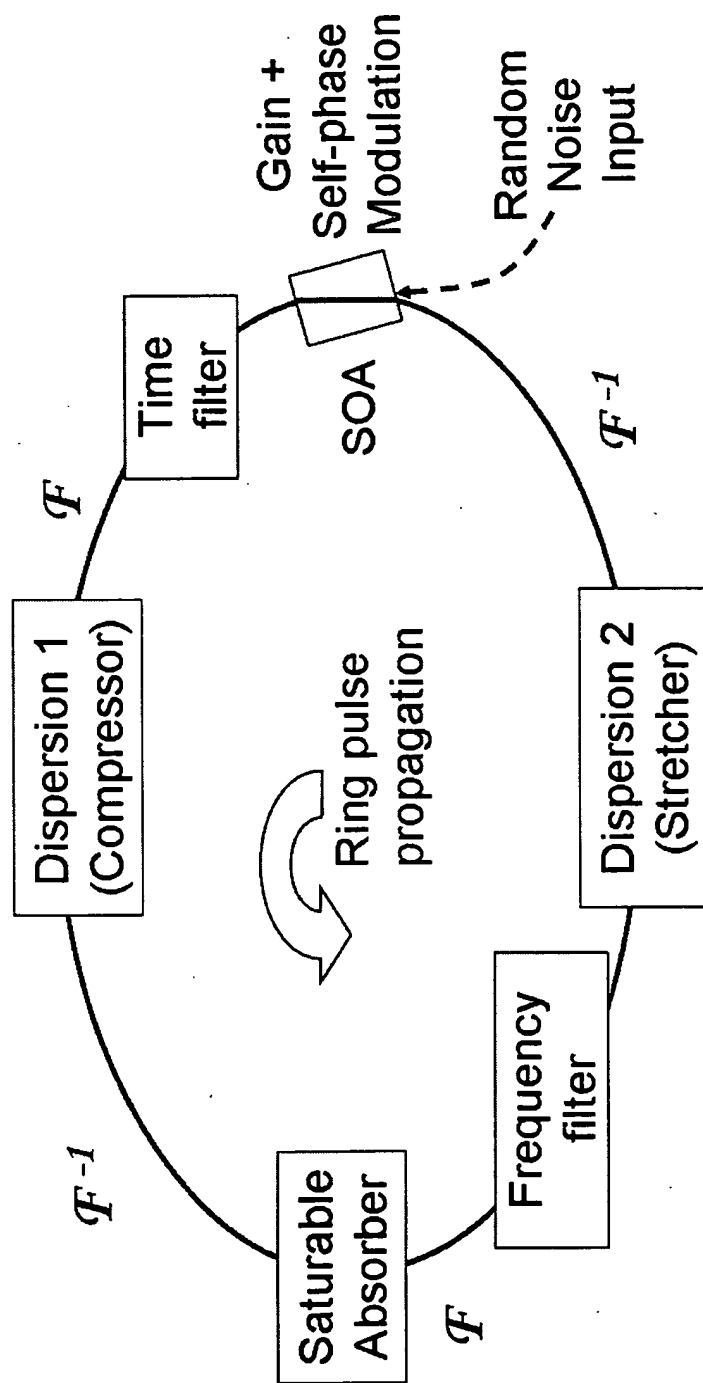


Figure 32

Quantity	Value
SOA small signal gain exponential coefficient	96 cm <sup>-1</sup>
SOA saturation energy	20.14 pJ
SA unsaturated reflectivity	2.2 %
SA saturation energy	0.31 pJ
Integrating SPM coefficient	0.35 pJ <sup>-1</sup>
Introduced GVD (by dispersion element 2)	4.1 ps/nm

Figure 33



Figure 34

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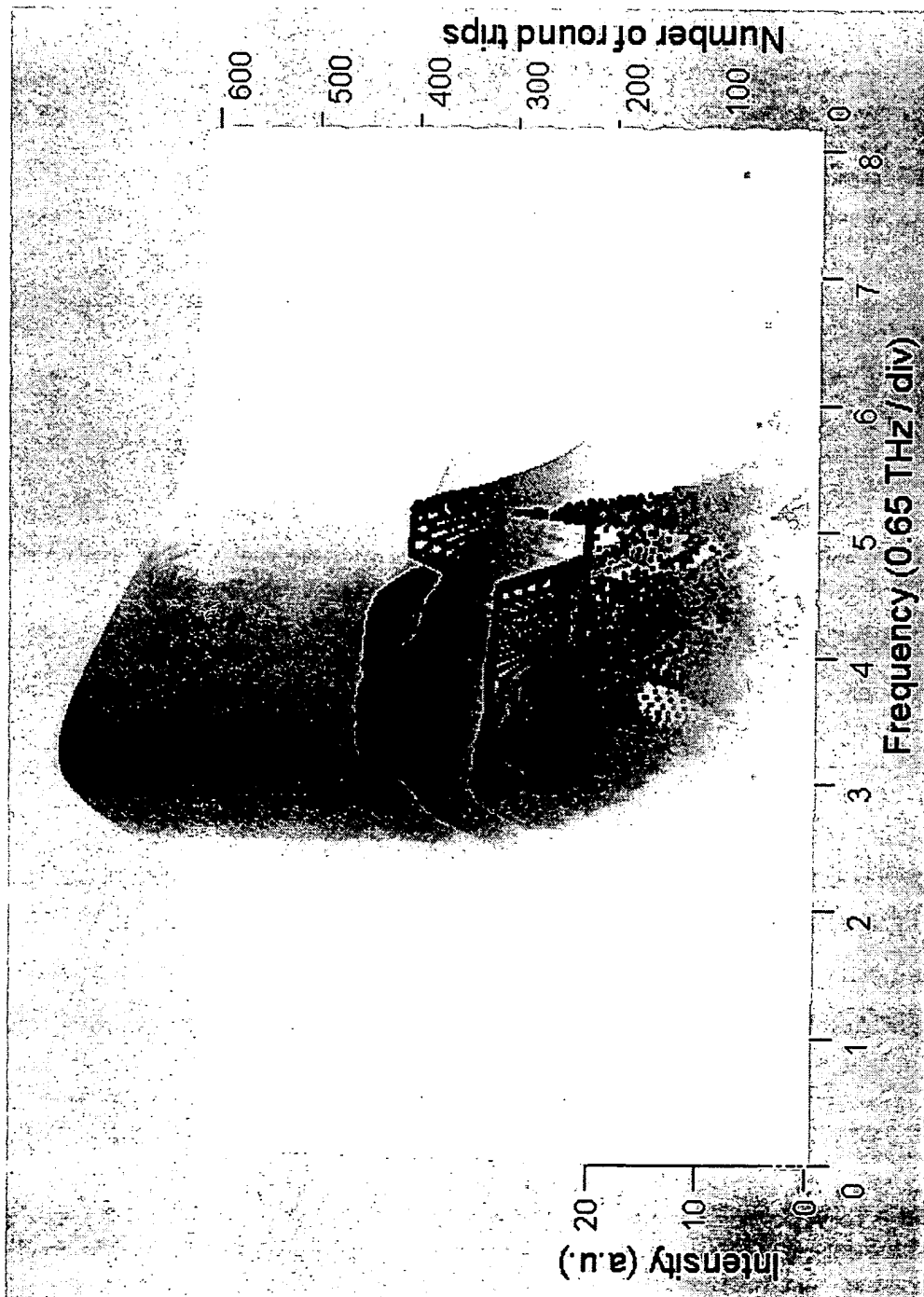


Figure 35

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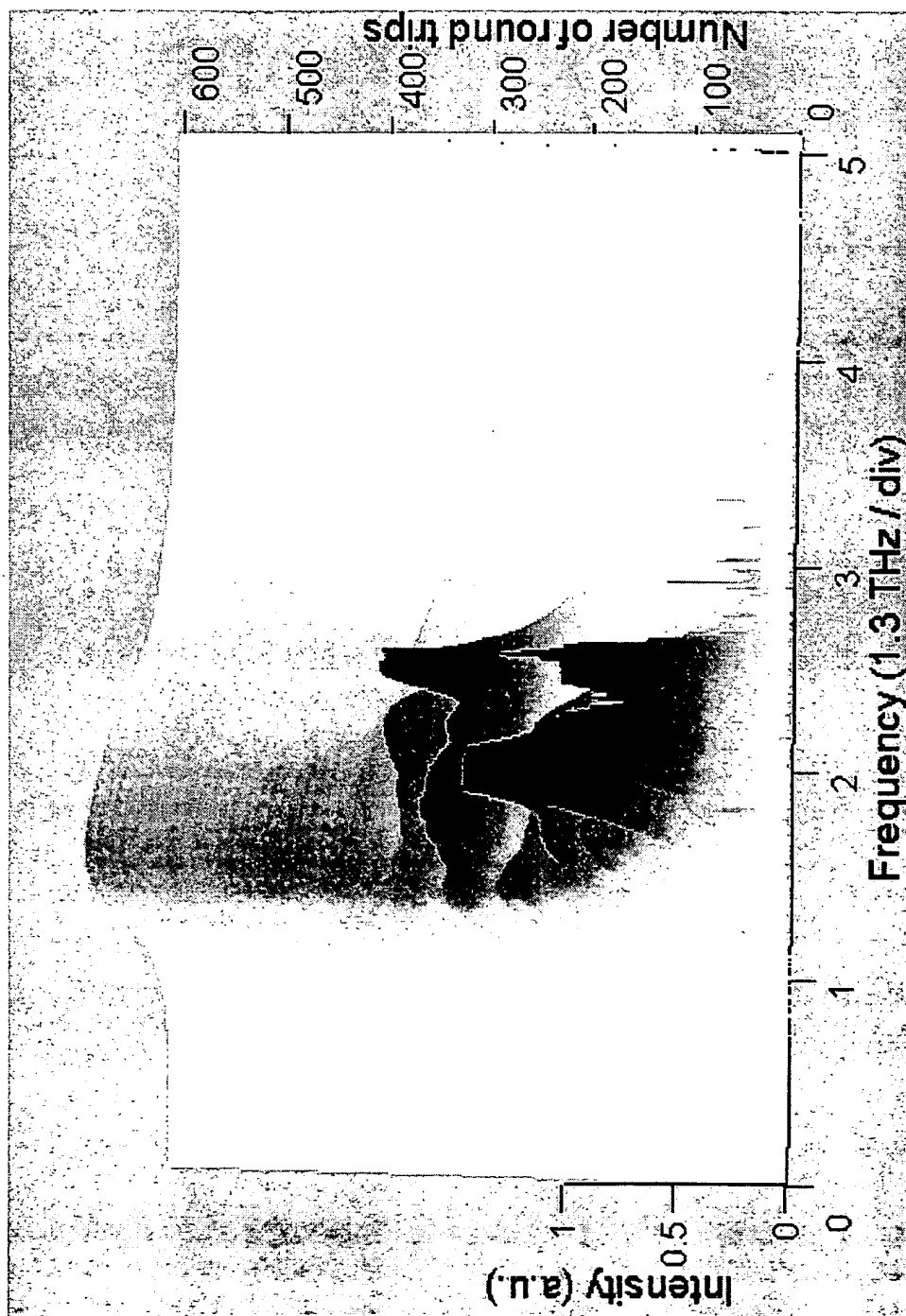


Figure 36



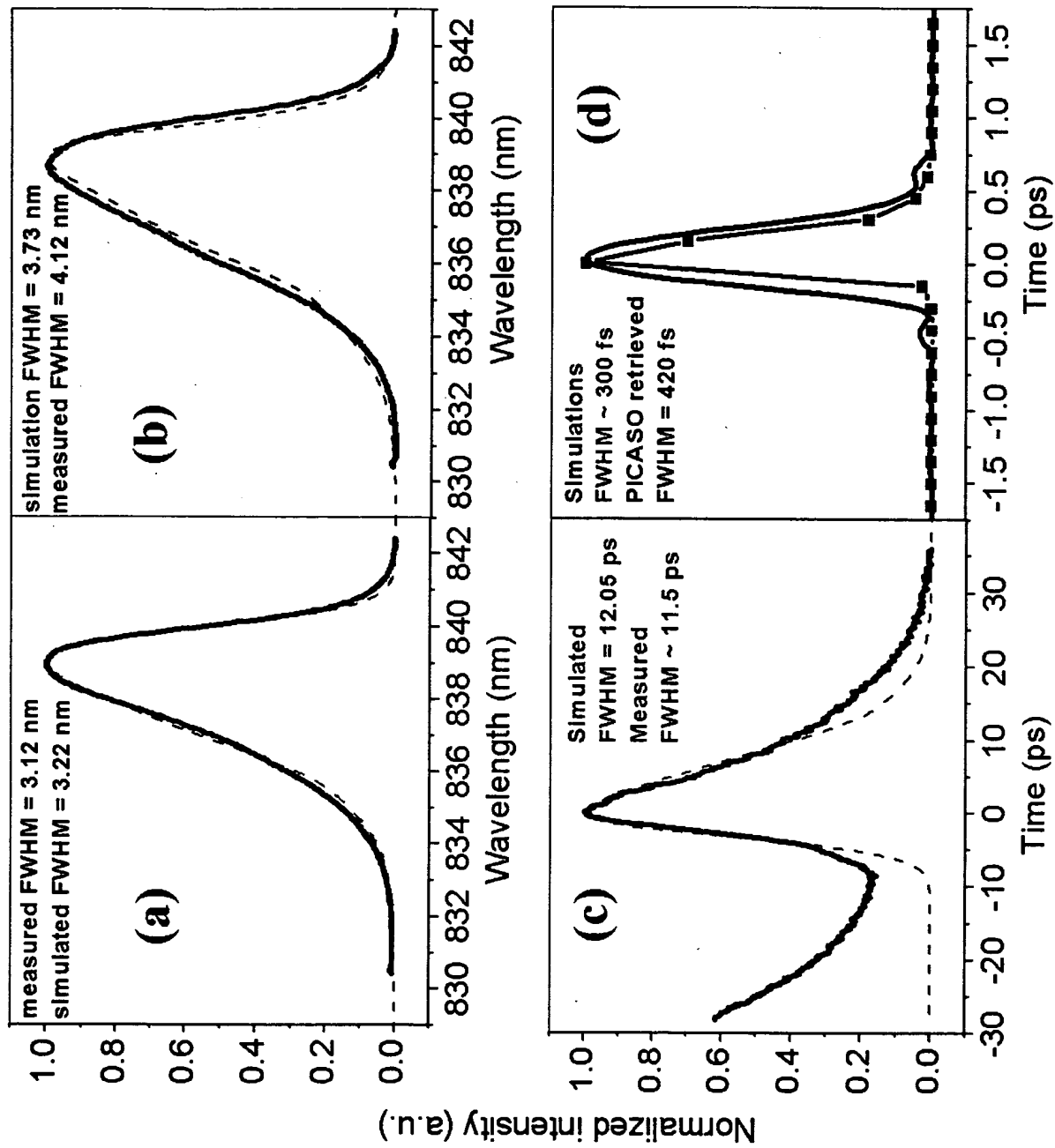


Figure 37

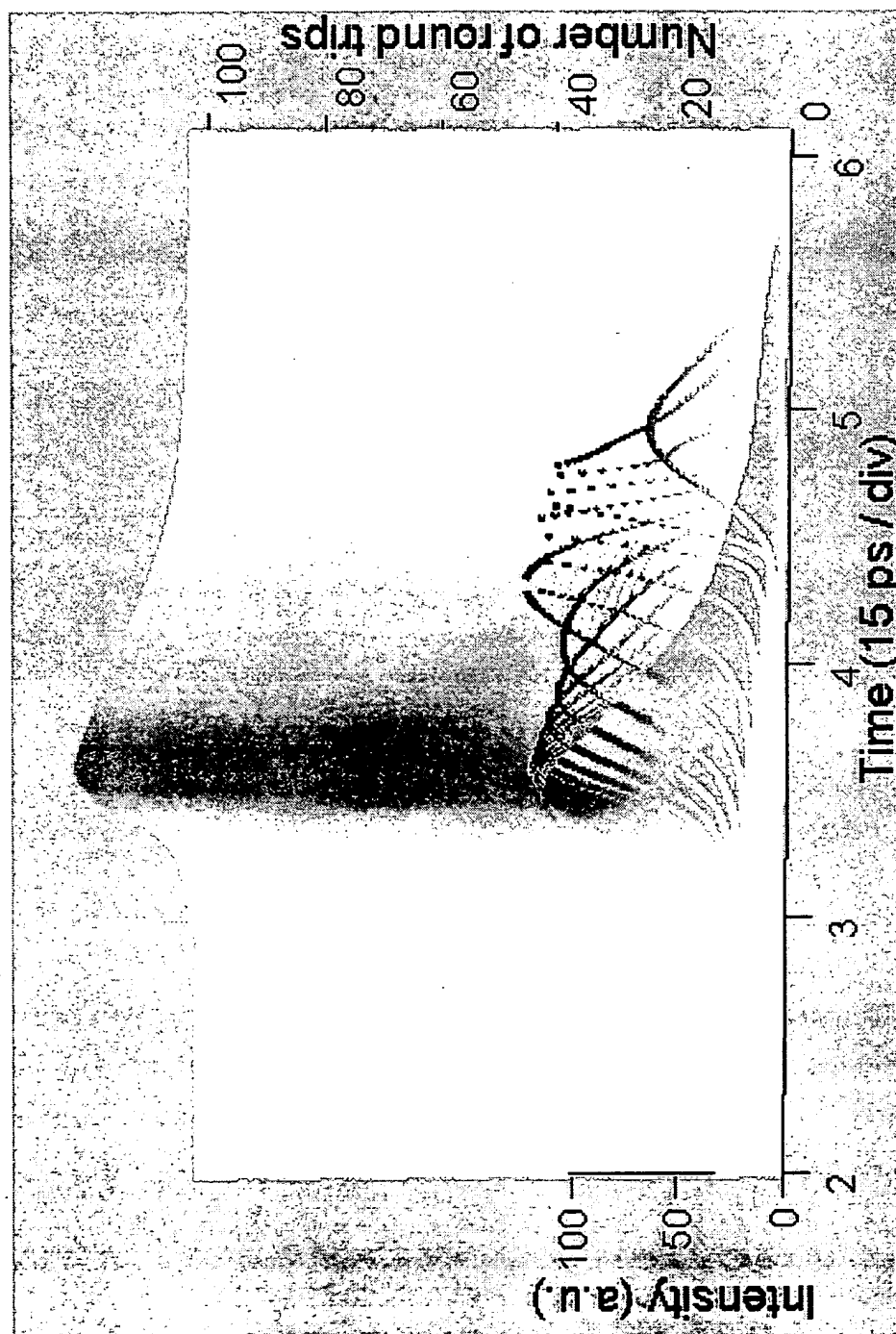


Figure 38

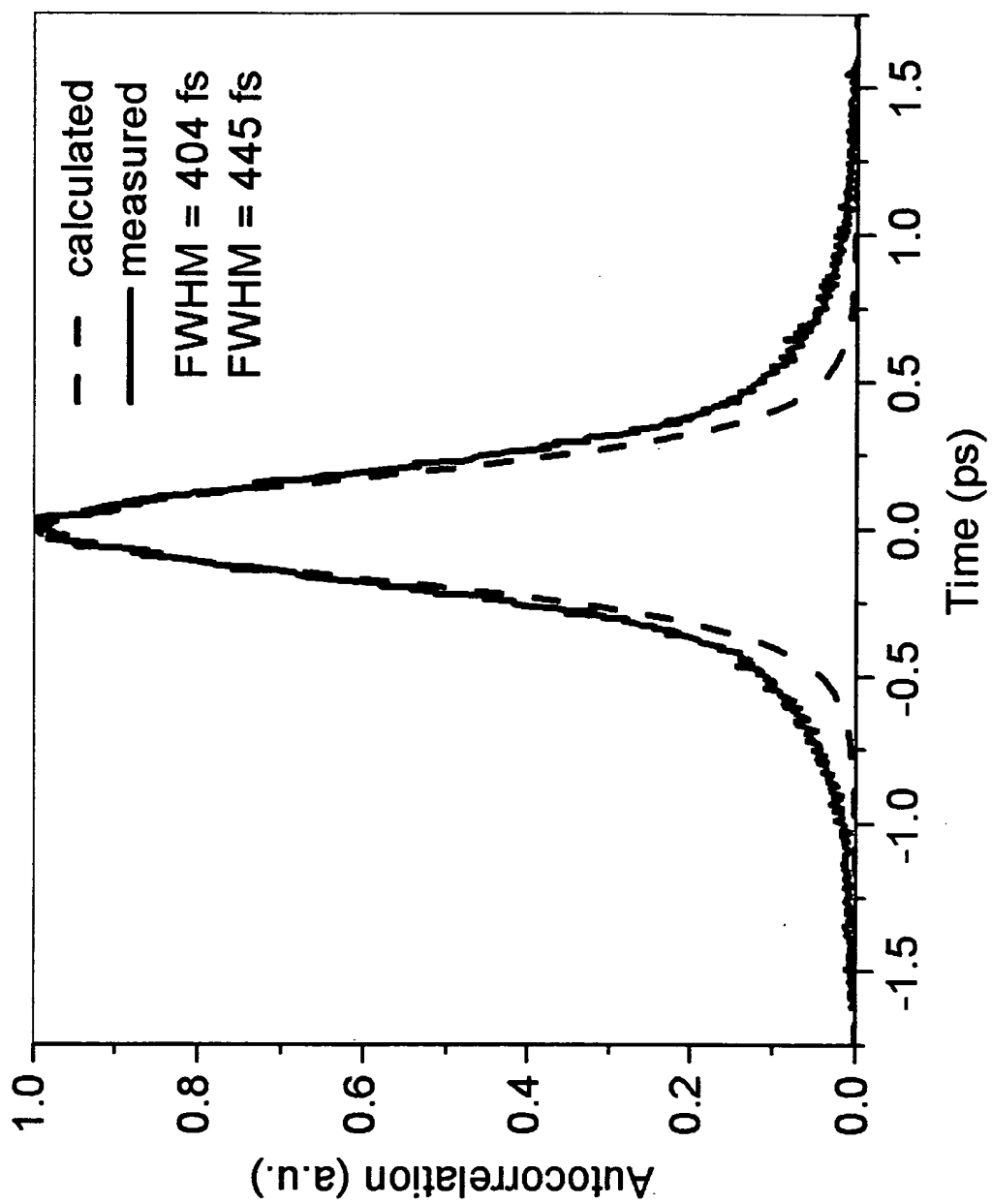


Figure 39

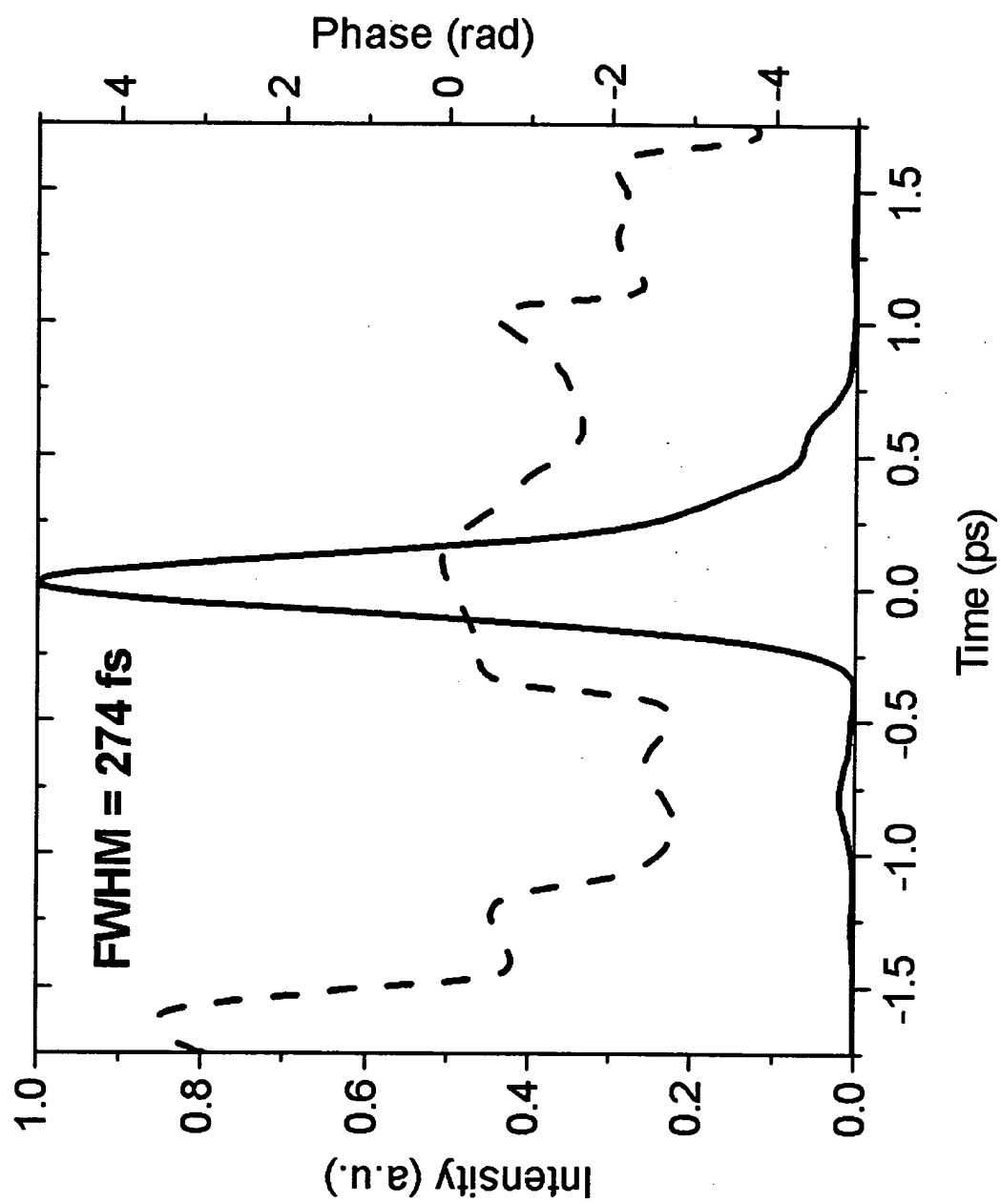


Figure 40

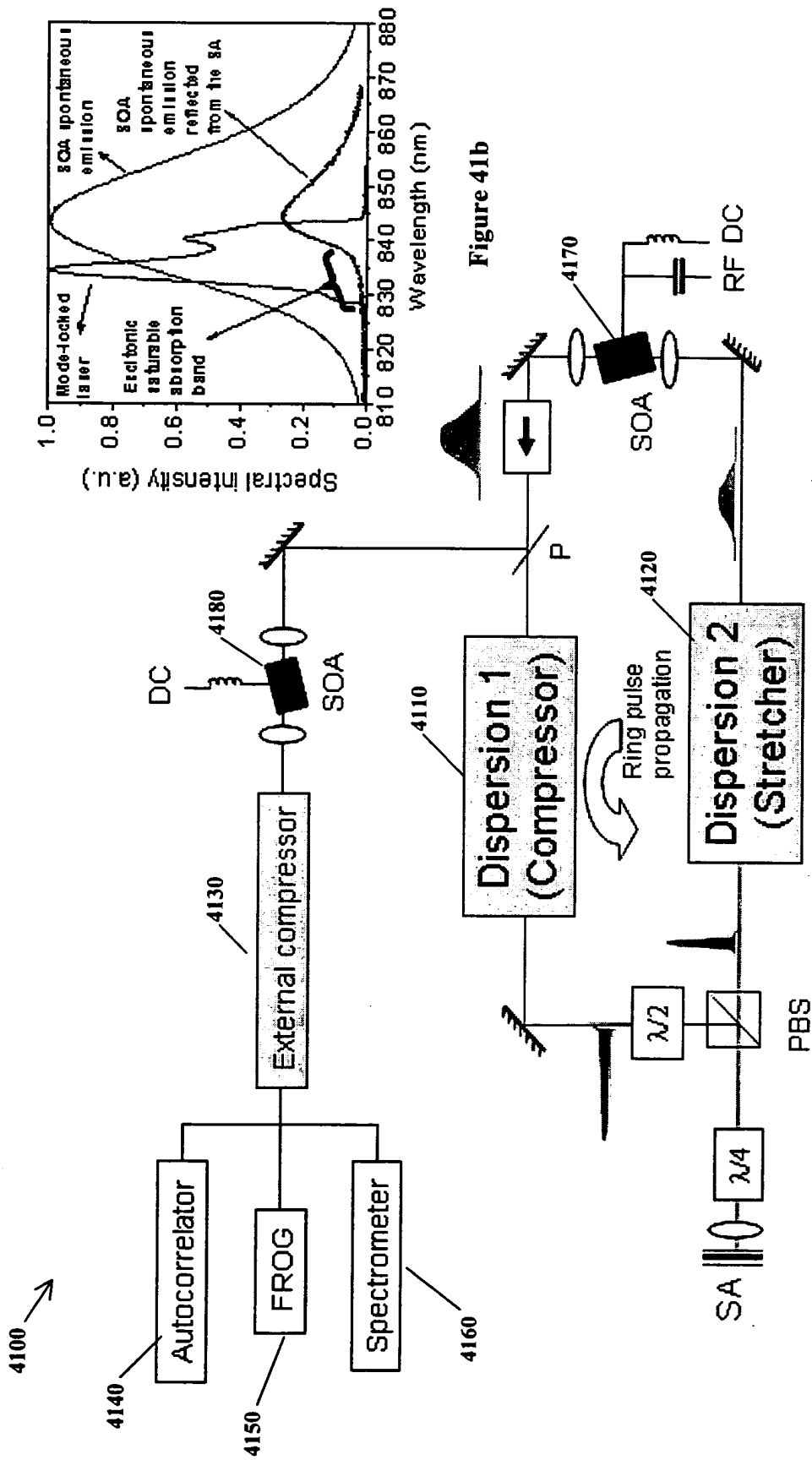


Figure 41a

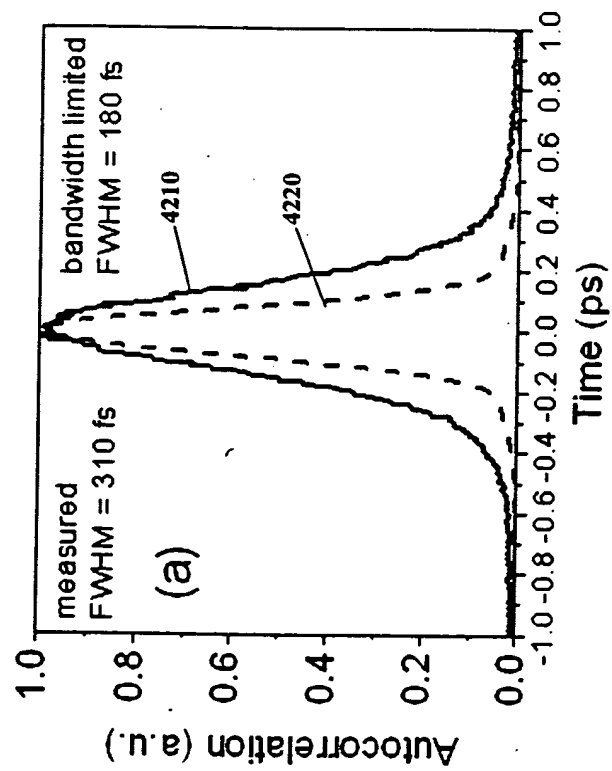


Figure 42a

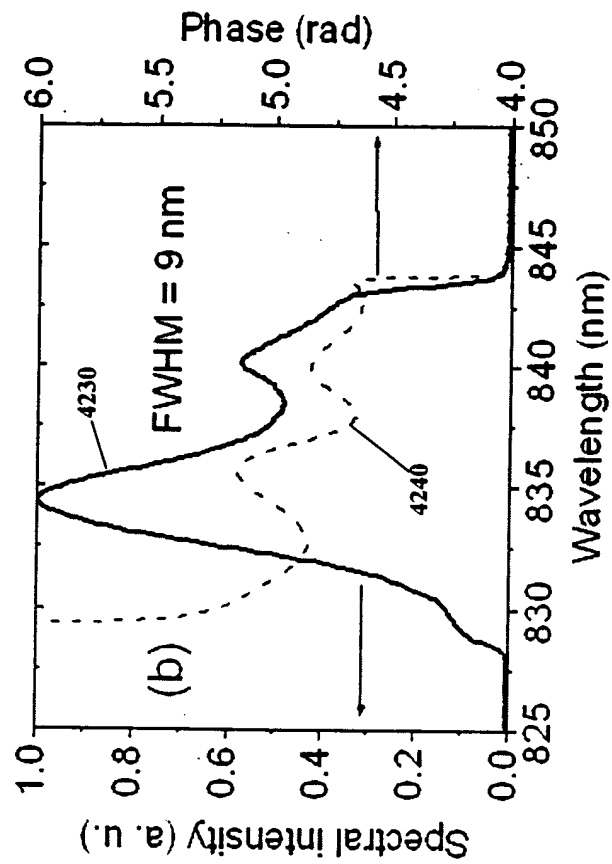


Figure 42b

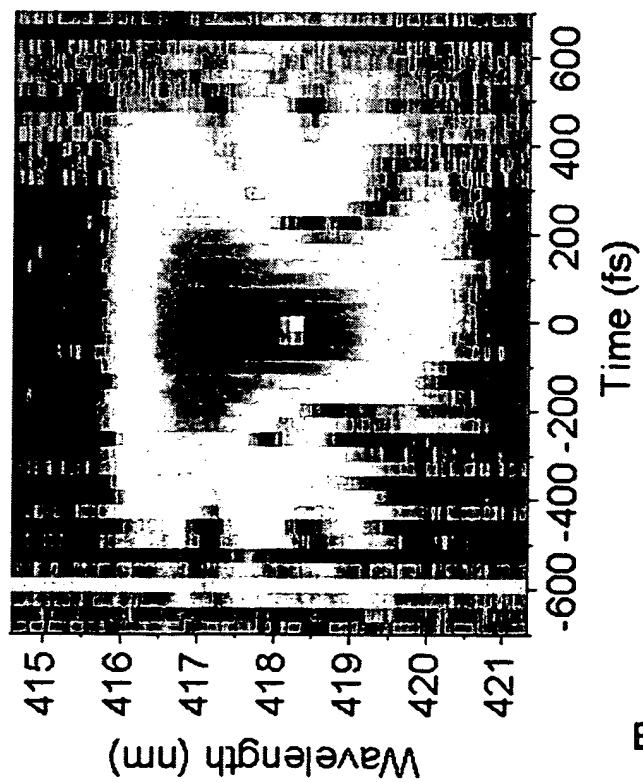


Figure 43a

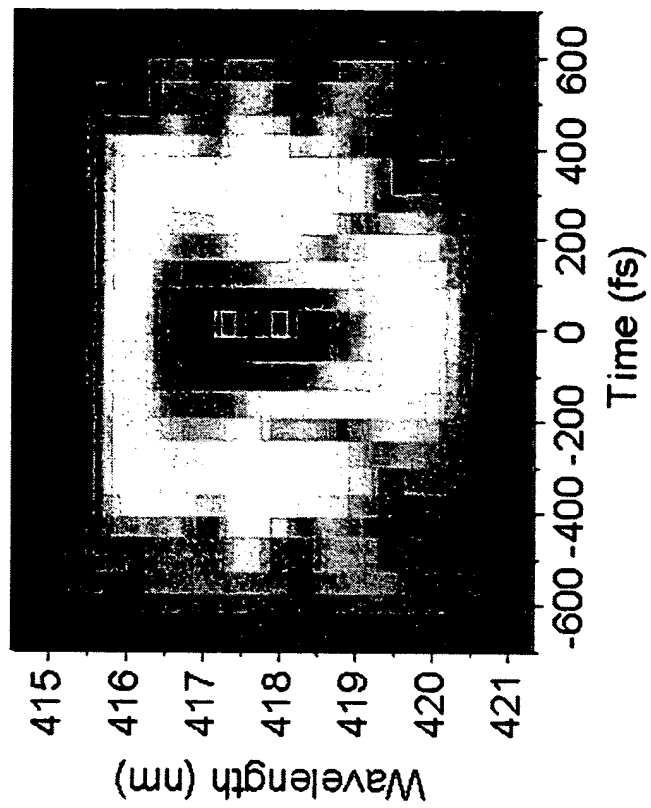


Figure 43b

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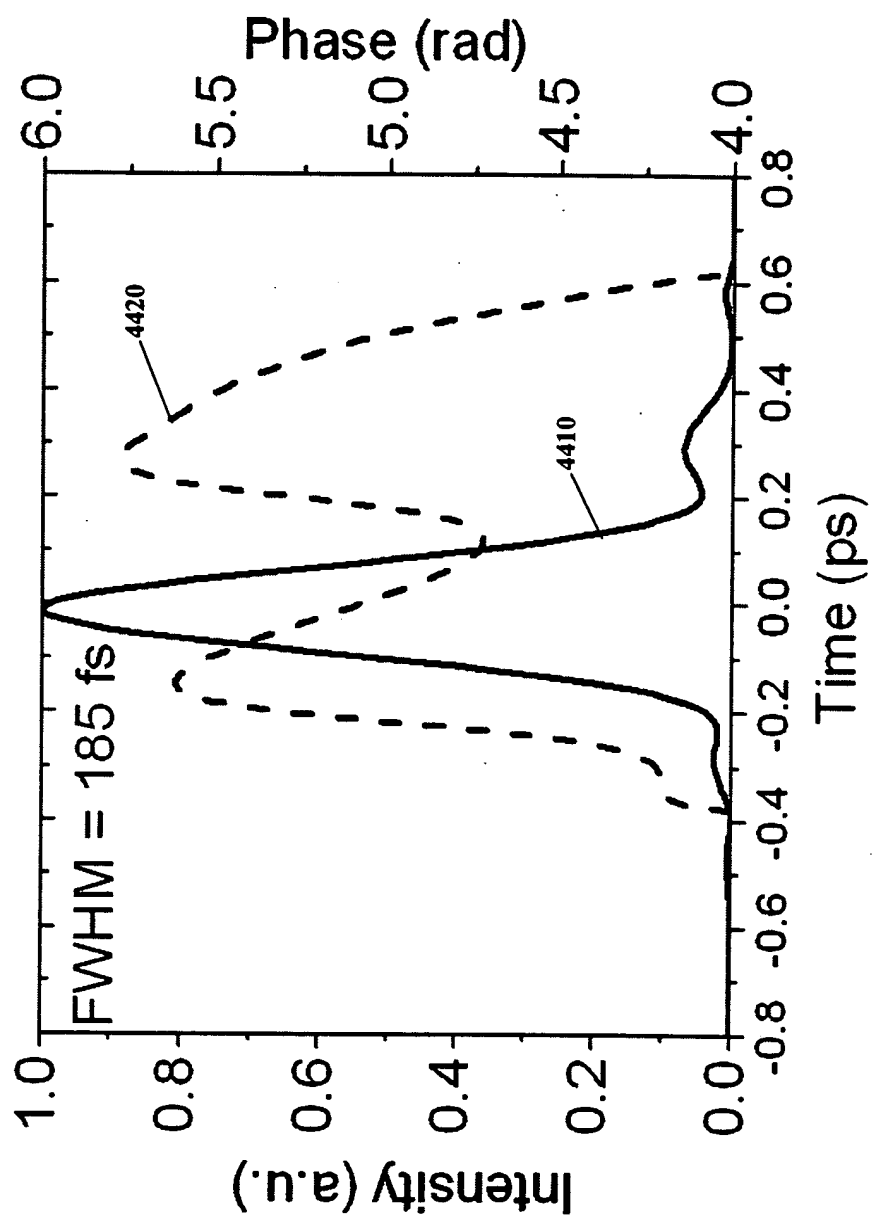


Figure 44